ELECTRICAL TIMES

THURSDAY
26 FEB.
1953
NINEPENCE

You will be asked for these—

are your stocks adequate?

Make sure you can meet the demand for Ferranti ELEMENTS by carrying adequate stocks.

Available in the following sizes:

7 ins. - 600 watts	14 ins. - 500 watts
10 ins. - 500 watts	14 ins. - 750 watts
10 ins. - 750 watts	14 ins. - 1,000 watts
10 ins. - 1,000 watts	14 ins. - 1,250 watts

We can offer immediate delivery of all lengths, loadings and voltages.

FERRANTI

Elements for Ferranti Radiant Electric Fires

FERRANTI

FIRST . . . FOREMOST . . . HOTTEST . . . SAFEST

FERRANTI LTD · MOSTON · MANCHESTER 10

London Office: KERN HOUSE, 36 KINGSWAY, W.C.2

FF12A

In six grades from soft to rock hard, and four qualities from medium grey to superfine, high-quality white, our range of polishing bobs includes the ideal wheel for every class of work. Send today for our free, illustrated brochure.

With greatly increased factory capacity we are now able to offer quick delivery.

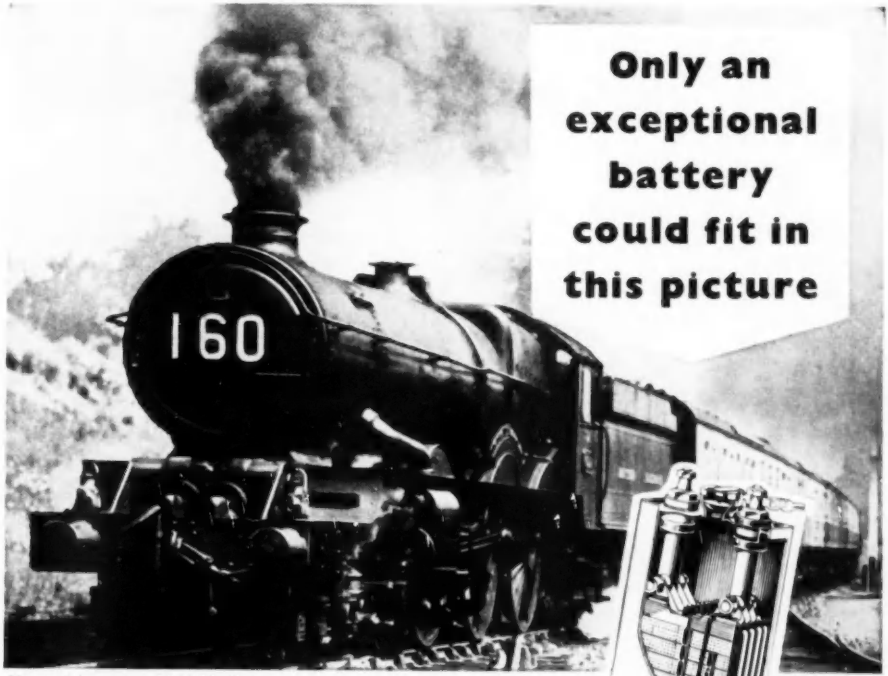
COOPERS FELT

Please send inquiries to Head Office and Works

COOPER & CO. (B'HAM), LTD., BRYNMAWR, BRECONSHIRE

Telephone: Brynmawr 312. Telegrams: Felting, Brynmawr.

Registered Office and Works: Little King St., B'ham, 19



Only an exceptional battery could fit in this picture

Photograph by courtesy of British Railways

When an express train is thundering down the rails, on schedule to the minute, every part of the locomotive is being put to a gruelling test. The batteries which travel on these giants—no less than any other part of the engine — have to be good to take the hours-long pounding every trip entails.

Eighteen years ago, the G.W.R. chose Nife steel batteries to ride on their locomotives, acting as watchdogs of safe rail travel, and British Railways' Western Region have seen no reason to change. Little wonder, since some of the original batteries are still in use after giving 17 and 18 years of trouble-free service! Today 4,500 Nife batteries provide the operative power for the Region's automatic train control system.

Nife Batteries can take it

Except when the brakes are on, Nife batteries are under a small but continuous load and subjected to constant vibration and shock. Nife batteries stand up to rough usage because they're made of steel — case and plates—and have great mechanical strength. They cost little to maintain and give maximum energy in a minimum space.

Exceptional ruggedness and dependability make

- *Costs less to maintain*
- *Indestructible steel case*
- *Takes up less room*
- *Instant recovery of voltage*
- *Simple maintenance*
- *Exceptionally long life*

Nife batteries in demand for all railway needs; signal controls and point machines, communications, lighting and control circuits on electric trains, electric locomotive control batteries, sub-station switchgear control and protection, and platform trucks. In fact, you'll find Nife Batteries doing the toughest jobs, the world over.

NIFE

STEEL BATTERIES

N52A

NIFE BATTERIES · 53 VICTORIA STREET · LONDON · SW1

A

HEATING BY 'THERMODARE'

"OFF PEAK" LOAD

Electricity taken at night costs less, and 8 hours' consumption will give central heating at an even temperature over 24 hours. Economy with efficiency —easy and low installation costs— attractive appearance. Requires no attention—guaranteed for 5 years.

TAX FREE
For industrial installation

Write for brochure

ABERDARE ELECTRIC COMPANY LTD.
36 VICTORIA STREET, LONDON, S.W.1
Telephone: ABBey 1060

THE POCKET OIL PEN

Designed to dispense one drop of light machine oil at a time on pressing the stud at the top

The Ideal Tool for

INSTRUMENT ENGINEERS
MECHANICS
MODEL ENGINEERS
HANDYMEN
ANGLERS
Etc. Etc.

Full details from:
ELKAY ELECTRICAL Mfg. Co. Ltd.
42 WOBURN PLACE, LONDON W.C.1
Telephone . . . . . LANgham 1975

IT IS A "CRESSALL-PRODUCT"

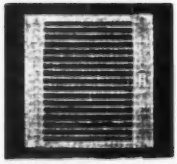
IN ADDITION TO A COMPREHENSIVE RANGE OF STANDARDISED SIZES, SPECIAL TYPES ARE MADE AT SHORT NOTICE

—

Send particulars of your requirements to our Technical Service Dept.

—

ASBESTOS WOVEN WIRE RESISTANCE NETS



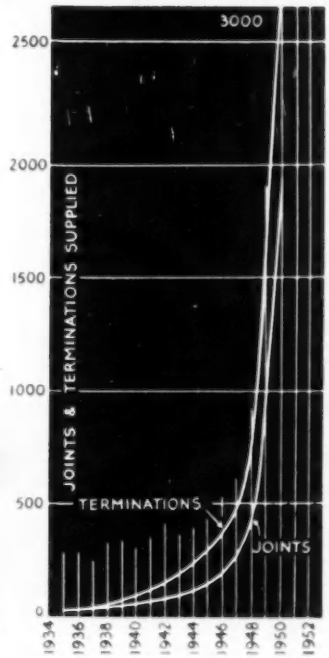
CRESSALL
Registered Trade Name of
THE CRESSALL MANUFACTURING CO. LTD.
Tower Street, Birmingham 19
Telephone: ASTon Cross 2666 (3 lines)
Telegrams: "OHMIC, Birmingham"

STYRENE BARRIER JOINTS

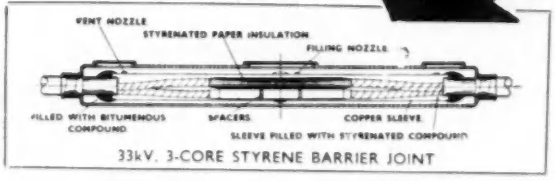
mean greater reliability for cable systems

WHENEVER a barrier joint or termination is needed, *Standard* Styrene joints will do the job better, more reliably and at a lower cost. Look at these unquestionable advantages which make it possible to install a barrier joint at every joint position.

- No maintenance.
- Actually IMPROVES with age.
- PROVED RELIABILITY (see sales graph).
- Low cost.
- THE ONLY PROVED screened barrier joint.



A typical Styrene joint



33kV. 3-CORE STYRENE BARRIER JOINT

Styrene Barrier Joints & Terminations

Standard Telephones and Cables Limited
Registered Office: Connaught House, Aldwich, W.C.2

POWER LINE DIVISION · · North Woolwich, London, E.16

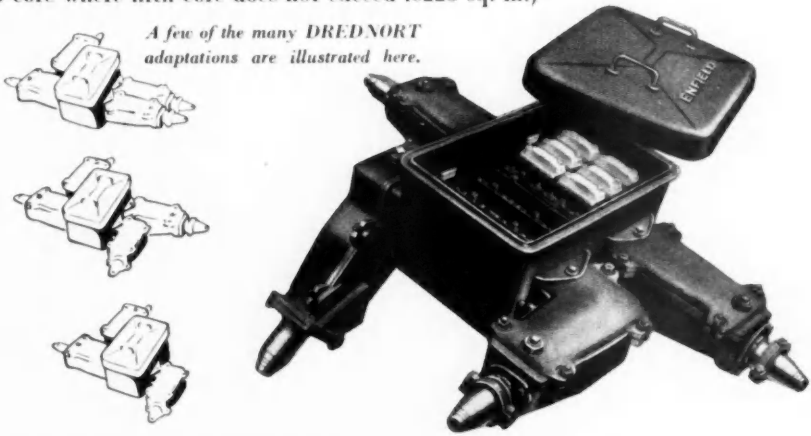
'DREDNORT'

The *Adaptable* Link Box

First patented over 30 years ago, these features still distinguish the ENFIELD "DREDNORT" link box:-

- **Detachable gland pockets (straight, angular or dipping) enable any distributor cable to be changed as load demands without disturbing inner assembly.**
- **Supplied with Links or H.R.C. Fuses.**
- **Duplicate Busbars and Links provided if required as a Selective Box.**
- **Supplied two or six ways (cables up to .3 sq. in. 4 core, or 5 core where fifth core does not exceed .0225 sq. in.)**

A few of the many DREDNORT adaptations are illustrated here.



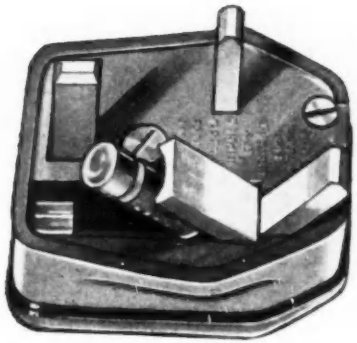
ENFIELD CABLE ACCESSORIES

Specify ENFIELD and solve your distribution worries.

Light Engineering and Mains Cable Accessories Department
WEST ROAD, NORTHUMBERLAND PARK, LONDON, N.17.
TOTtenham 6611 (Works) London Office: HOLborn 9292

821

PLUGS AND SOCKETS TO B.S.S. 1363



The Plug

Fitted with patent* hinged pin, enabling fuses to be changed without tools.

Terminals removable for easy wiring.

Standard finish brown, — Cat. No. DS 16.

Fuses to BSS 1362 interchangeable with standard makes.

*Patent No. 638780.

The Sockets

Flush type unswitched socket with insulated square plate. Standard finish brown — (Cat. No. DS 17).

Flush type with metal front plate (DS 18).

Surface type with insulated cover. Standard finish brown (DS 19).

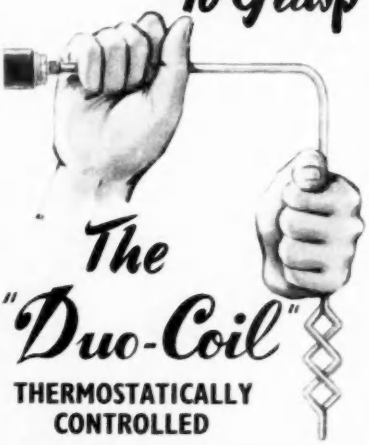
All sockets fully shuttered.

Porcelain insulator of minimum projection for easy wiring.

DS PLUGS LTD · MANCHESTER · 5

AN OPPORTUNITY

To Grasp



The "Duo-Coil"

THERMOSTATICALLY CONTROLLED

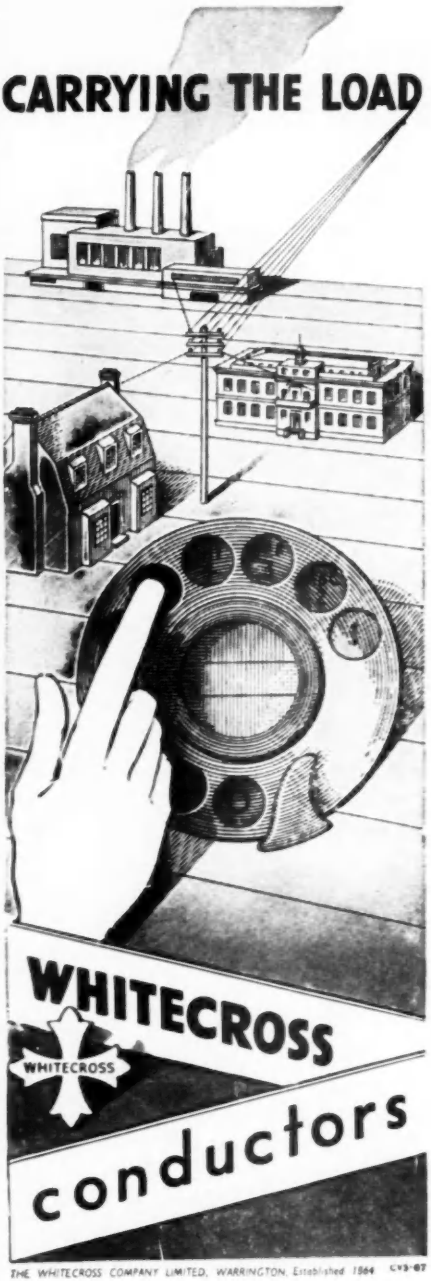
IMMERSION HEATER

- RIGID AND SIMPLE CONSTRUCTION FOR LONG LIFE AND ECONOMY
- ROBUST TEMPERATURE CONTROL non-radio interference
- ONE LOADING FOR ALL SIZES range 200/250 volts
- FIXED RATING 2.5 KW AT 240 V a.c. only
- LENGTH OF HEATER VARIED BY BENDING JIG
- JUST LOOK AT THE PRICE from £3 15s. 3d. plus P.T.
- AND THIS *INCLUDES* THE THERMOSTAT

STAND NO. 71
ELECTRICAL ENGINEERS EXHIBITION, EARLS COURT

GILLOTT
ELECTRO STEAM COOKERS Ltd.
COTSWOLD WORKS, CHALFORD
NEAR STROUD : GLOS.
Telephone—Brimscombe 2276/7

CARRYING THE LOAD



WHITECROSS
WHITECROSS
conductors

THE WHITECROSS COMPANY LIMITED, WARRINGTON. Established 1864 CWS-67

GIBRALTAR gets new power network

What could be more fitting than the rock of Gibraltar—a by-word for dependable strength—being provided with a new network of power cables supplied and installed by the BICC group.

Over twenty-one miles of cables were laid, the bulk of which were of the Mass-Impregnated Non-Draining type. They include 6,600 volt cables for the ring main, and low voltage distribution and service cables. Approximately two miles of Pilot and Telephone cables were also used.

The original 2,200 volt network was laid by us in 1896. The cables were still in good condition: only the need for higher voltages necessitated their replacement.

B.I. Callender's

MASS-IMPREGNATED NON-DRAINING CABLES

BRITISH INSULATED CALLENDER'S CABLES LIMITED
NORFOLK HOUSE, NORFOLK STREET, LONDON, W.C.2

VARIABLE SPEED DRIVES

direct from

A.C. VARIABLE SPEED

1 — 500 H.P.

No Belts
No Friction Drive
High Efficiency

COMPACT COMPETITIVE
AND
GUARANTEED FOR EVER

a BELL that means Business—

. . . big Business. Here's a line with a reputation for quick and easy sales. Stock and display the "All-in-One" domestic bell, it's a winner.

Efficiently and attractively designed as a complete unit, the "All-in-One" carries all working parts under the dome. A flat torch battery housed under the snap-on bakelite cover gives an average life of twelve months' working.

Remember—the " All-in-One " is easily fixed, is presented in a modern pack, and sells on sight.

You can sell Gents' bells with confidence, they are backed by over eighty years' experience in the manufacture of electrical equipment.

Obtainable through your usual wholesaler.

RETAIL 11/6 PRICE

Without battery

GENTS' OF LEICESTER | **DOMESTIC AND INDUSTRIAL BELLS**

GENT AND COMPANY LIMITED . FARADAY WORKS . LEICESTER

47 Victoria Street, London, S.W.1. Tangent House, Leazes Park Road, Newcastle 1

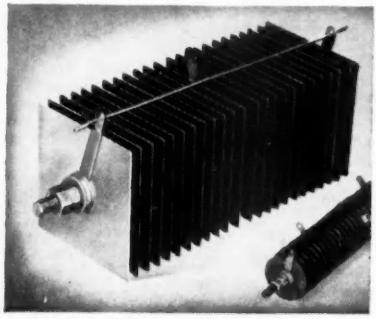
Winchester House, Victoria Square, Birmingham 2

Other products include,

INDICATORS · FIRE AND BURGLAR ALARMS · TELEPHONES · STAFF LOCATORS · LUMINOUS CALL SYSTEMS, etc.

Selenium RECTIFIERS

What is your rectifier problem?



- **LONGER LIFE**
- **LIGHTER WEIGHT**
- **MORE UNIFORM CHARACTERISTICS**
- **COMPLETE RELIABILITY**
- **Or do you require a speedy delivery?**

Whatever your problem, we shall do our utmost to help

We cordially invite your enquiry and place our resources unstintingly at your disposal

THE AUTOMAT COMPANY
104, Hazelhurst Rd., Worsley, Lancs.

There's always a call for

BARBOUR'S
FLAX LACING THREAD
for lacing switchboard cables

also
BINDING LINEN THREAD
No. 30/3 Beeswaxed to P.O. Specification on 2oz. Cops

WM. BARBOUR & SONS LTD. LISBURN N. IRELAND

INSIST ON **Grubb** HEATING UNITS

GUARANTEED FOR TWO YEARS

ALL ELECTRIC

Immersion Heaters and Circulators

LOADINGS AVAILABLE
2, 3 AND 4kW

Thermostatically Controlled

Advantages of the GRUBB Domestic Water Heater with Thermostatic Control:

(1) AUTOMATIC HOT WATER SUPPLY. (2) SAVES SOLID FUEL WORRIES. (3) MINIMUM ELECTRICITY CONSUMPTION.

Supplied in all sizes from 12" to 42"

HOT WATER

GRUBB PRODUCTS are stocked by ALL LEADING WHOLESALERS

Also available

AUTOMATIC CENTRAL HEATING
WITH "GRUBB" RADIATORS

All Electric, Economical and Trouble-Free

Write today for Price Lists, Brochures and Trade Terms to Sole Manufacturers

GRUBB ENGINEERING COMPANY LTD.

BIRMINGHAM 12 **Export Enquiries Invited**

The Vital Link . . .

. . . with safety in the hazardous enterprise of the deep sea trawler is its radio and radar equipment upon which safe navigation depends. Thousands of soldered joints contribute to the efficient functioning of this delicate apparatus. One dry or H.R. joint could mean the breakdown of a circuit, the destruction of the vital link, a perilous voyage.

Faultless Fluxing preserves the Vital Link

Dry or H.R. joints are impossible with Superspeed for the flux is always released in exactly the correct proportion. This faultless fluxing action is achieved by the unique STELLATE core which gives six points of rapid solder collapse. At soldering temperature the activated rosin flux is released immediately for effective spreading and wetting. Superspeed is being used more and more in the production of radio and radar equipment where faultless joints are essential.

Superspeed

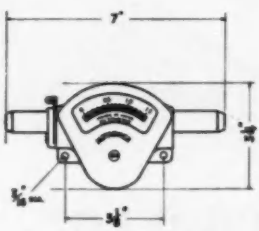
"White Flash" *activated rosin-cored solder for general electrical, electronic and telecommunication work and all standard uses. A.I.D. and G.P.O. approved. Complies with M.O.S. Specification DTD 599. In all standard tinflead alloys, 10-22 s.w.g. Also available in a range of coloured cores, indispensable for simple intermediate and final inspection and circuit or operator identification. Samples of Superspeed and the comprehensive Superspeed booklet gladly sent on request. Technical advisers are available for free consultation. Cored and solid solder rings and solid solder washers supplied to customers' specifications.*

MANUFACTURED BY THE **ENTHOVEN** GROUP

Marketed by Enthoven Solders Ltd., Enthoven House, 89, Upper Thames Street, London, E.C.4. Tel. Mansion House 4531

The Latest ... in air-filter inspection

See at a glance with a METROVICK FILTOMETER



N.B. The FILTOMETER is available in the standard ranges of 0 to 0.5, 0 to 1.5 or 0 to 3 inches of water. Other ranges can be supplied if required.

Send for Publication E.S. 4352/1

This low-priced easily installed instrument—something entirely new on the market—makes the routine inspection of air-conditioning filters quick and easy.

The ordinary method of withdrawing each cell for visual inspection is time-wasting and laborious, cells in good condition often being needlessly removed. With the Filtometer permanently fitted across the filter battery the need for cleaning can be judged by a glance at the dial pointer.

A valuable feature is the finger operated spring-return valve which safeguards the indicator from being clogged with dust, the valve being open only when a reading is being taken.

METROPOLITAN-VICKERS ELECTRICAL CO. LTD., TRAFFORD PARK, MANCHESTER 17
Member of the A.E.I. group of companies

METROVICK *Filtometers for more efficient air-conditioning*

G/A 202

We're up in the balcony at the

IDEAL HOME EXHIBITION

Here you will find a thoroughly practical layout with demonstrations in full swing. Staffed with complete teams of 'ENGLISH ELECTRIC' demonstrators and a supporting Sales organization.

HOPE TO SEE YOU THERE ON STAND 42

'ENGLISH ELECTRIC'

Domestic Appliance Sales

THE ENGLISH ELECTRIC COMPANY LTD., QUEENS HOUSE, KINGSWAY, LONDON, W.C.2.

K for CONDUCTORS

COPPER WIRE
plain or tinned, cotton, paper or asbestos covered.

ALUMINIUM WIRE and STRIP
plain, cotton, paper or asbestos covered.

COPPER or ALUMINIUM STRAND
for overhead power transmission.

COPPER or ALUMINIUM BUSBARS

CADMIUM COPPER

Also K *for* LIGHT ALLOY

CONDUIT TUBING, BARS, TUBES AND SECTIONS

Durcilium (Regd.) Alumagnese

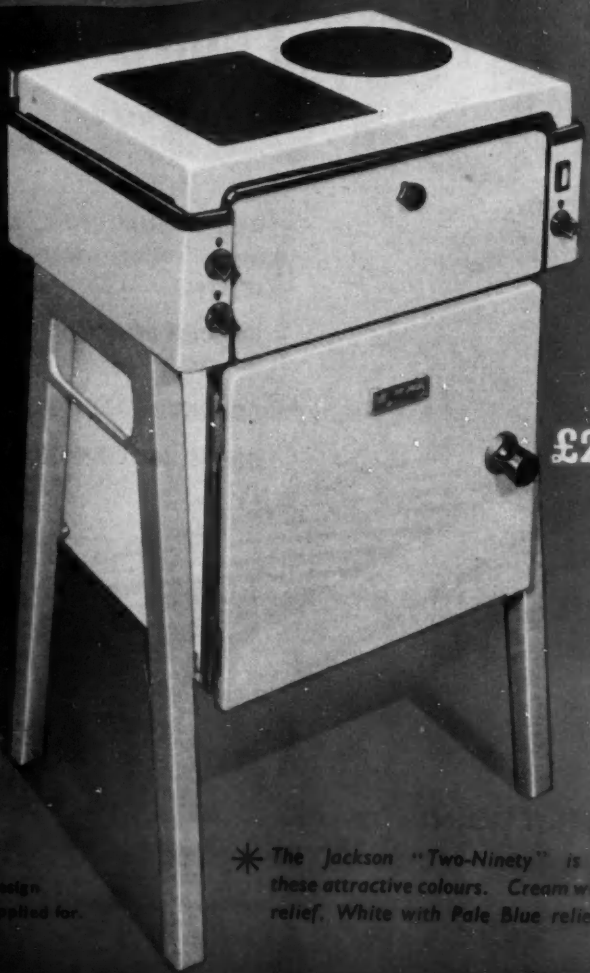
E. & E. KAYE LTD.

PONDERS END · ENFIELD · MIDDLESEX

Telephone.. Howard 1601
Telegrams.. Cuwire, Enfield

K.5. T.A.5284

Jackson revolutionize with the new



Price
£22-17-6

✳ *The Jackson "Two-Ninety" is available in these attractive colours. Cream with Pale Green relief. White with Pale Blue relief, all Cream.*

...patterned design
...patent applied for.

Electric Cooker Design

Jackson "TWO-NINETY"

Look at these selling features:

1 Light weight lift off hob

2 Specially designed spillage channels

3 Hand level controls

4 Fully accessible hob assembly

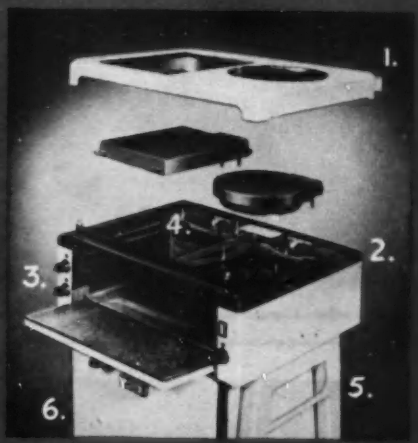
5 Built-in towel rail

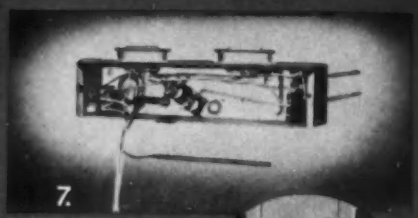
6 Large capacity oven (24 lb. turkey)

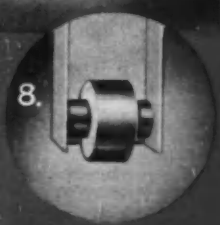
7 Complete unit wiring assembly, readily removable

8 Rollers on rear legs for easy movement

9 Lighter colour enamel for oven interior



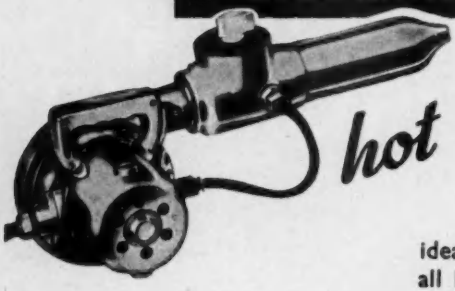




A really low priced family size cooker with all the selling features the Industry wants

THE JACKSON ELECTRIC STOVE CO. LTD., 143, SLOANE STREET, LONDON, S.W.1

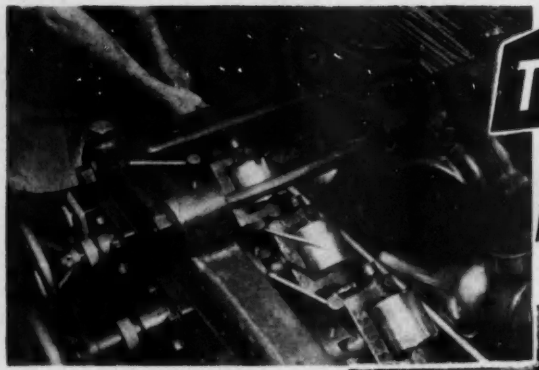
MARTINDALE



hot air on tap

Martindale Hot Air Blowers, in powers from 500-3,000 watts, are ideal for the quick drying of windings of all kinds before and after varnishing, and for many other purposes connected with the electrical industry. Can be used with the heat off as blowers for dust removal and vacuum cleaning.

MARTINDALE ELECTRIC CO. LTD., 45 Westmorland Road, London, N.W.9



THE SKILLED HANDS OF SERCK

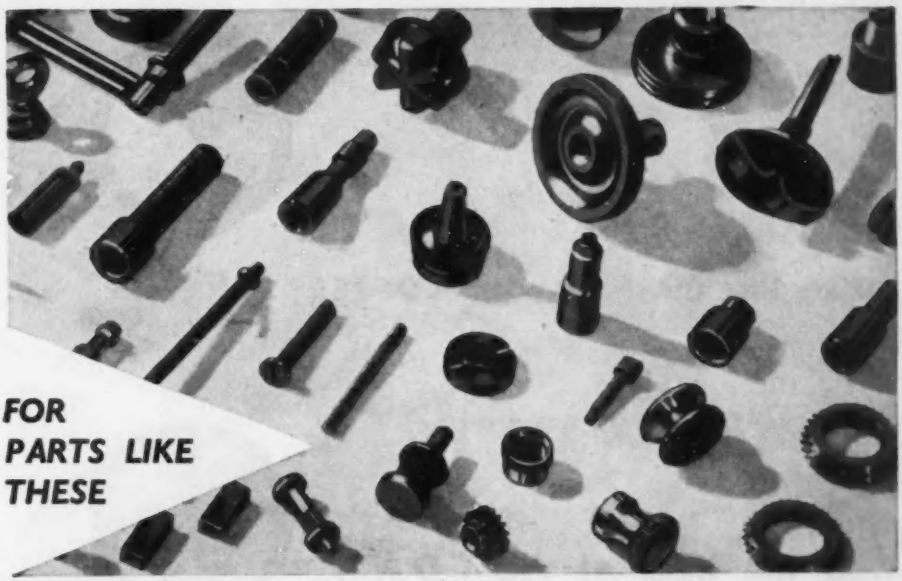
(1) Machine straightening of Tubes ensures close limits and increases output.

(2) Testing straightness of Tubes by Needle Micrometer.

Serck

NON-FERROUS TUBES

Serck Tubes Limited, Birmingham, 11



specify McKECHNIE

EXTRUDED RODS and SECTIONS

McKechnie Extruded Brass and Bronze Rods and Sections are available in an almost limitless variety of shapes and sizes. Their use increases output, reduces or entirely eliminates machining, saves tools and labour. For further information, *please write to McKechnie Brothers Ltd., 14 Berkeley Street, London, W.1.*

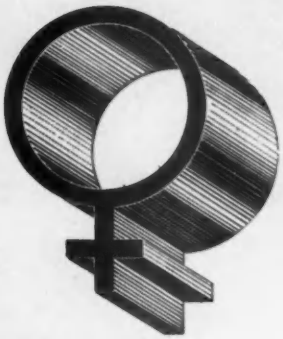
★ *See our Exhibit at the London Building Centre, Store Street, London, W.1.*

McKECHNIE
metal technique

McKECHNIE BROTHERS LIMITED

Metal Works: Rotton Park Street, Birmingham 16. *Branch Offices:* London, Leeds, Manchester, Newcastle-on-Tyne, Gloucester. *Solder Works:* Stratford, London E.15. *Copper Sulphate and Lithopone Works:* Widnes, Lancs. *Enquiries for Lithopone and Solder to:* 14 Berkeley Street, London W.1. *South African Works:* McKechnie Brothers S.A. (Pty) Ltd. P.O. Box No. 382, Germiston, S.A. *New Zealand Works:* McKechnie Brothers (N.Z.) Ltd., Carrington Road, New Plymouth.

G.55



make the most of your COPPER

with the help of the C.D.A...

Choice of the right grade of copper or copper alloy and its use in the right way saves time, money and material. The C.D.A. exists to help you with expert advice on any of the varied uses of copper and with technical publications, obtainable on application — all free of charge.

COPPER DEVELOPMENT ASSOCIATION

KENDALS HALL · RADLETT · HERTS · TEL: RADLETT 5616

for festive occasions—

FIESTA-FLOOD

This is the Fiesta-Flood—a Simplex product that will spotlight the celebrations and jollifications at Coronation time. Fiesta-Floods take a 300-500 watt General Service lamp, a 500 watt Class B2 Projector lamp or a 250 watt MBT/U Blended lamp. (The G.S. and Blended lamps give a medium beam spread from 20° to 40° while the Class B2 Projector lamps give a narrow beam from 15° to 20°)

CONSTRUCTION: aluminium. Silvex-finished. Highly specular internal reflecting surfaces. Convex, heat-resisting cover glass sealed to body by rubber gasket. Two feet of three-core T.R.S. cable. ¾" E.T. male thread conduit stem mounting

price 82/6

(6/- extra with coloured glass)

Spare glasses (clear) 23/6 each
(coloured) 29/6 each

Write for illustrated leaflet to the Advisory Bureau at Creda Works, Blythe Bridge, Staffs, or at 217/9 Tottenham Court Road, London, W1

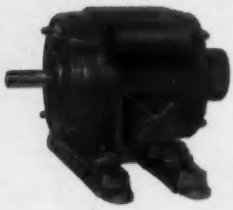
made by the house of Simplex

Simplex Electric Company Limited
Oldbury Birmingham and Branches

A TI COMPANY

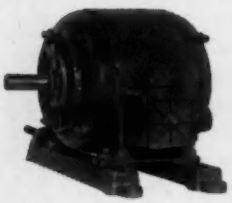
FOR DISCRIMINATING POWER USERS

CAPTIVE MOUNTED STARTER



'EMPRESS' SINGLE PHASE MOTOR

AUTOMATIC DIRECT SWITCHING STARTER

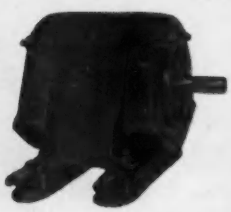


PROTECTED MOTOR SINGLE OR THREE PHASE

AN INFINITE VARIETY of A.C. Electric Motors & Control Gear

LOOM MOTOR FOR DIRECT OR CLUTCH STARTING

EXPLOSION PROOF MOTOR



DOWN-DRAFT DRIP PROOF MOTOR

FLANGE MOUNTED MOTOR

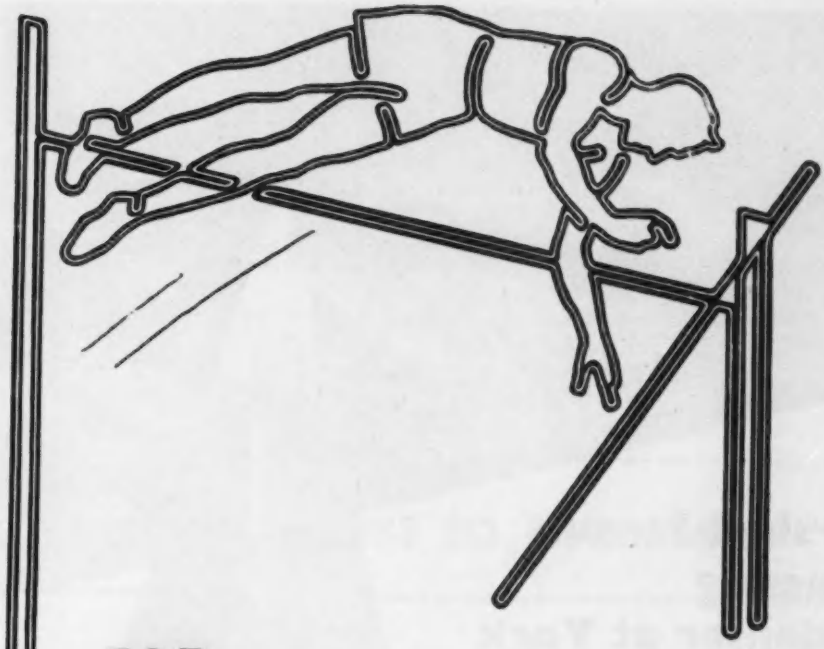
A few of the many products of....

BROOK MOTORS LTD

HUDDERSFIELD • ENGLAND

MAKERS OF A.C. ELECTRIC MOTORS AND CONTROL GEAR

I.LS.246



FOR
TIP-TOP PERFORMANCE

Crompton

RUBBER CABLE

ELECTRICAL EQUIPMENT

CROMPTON PARKINSON LIMITED, CROMPTON HOUSE, ALDWYCH, LONDON, W.C.2
Telephone: CHAncery 3333 *Telegrams: Crompark, Estrand, London*

Eversched-Straub Degassing Condenser at York

In their power station at The Cocoa Works, Rowntrees have installed an Eversched-Straub Degassing Condenser to provide gas free samples for accurate measurement of steam purity by the "Dionic" system of conductivity determination.

Prior to the introduction of the Eversched-Straub Degassing Condenser, the presence in steam of non-condensing gases such as ammonia, carbon dioxide and hydrogen-sulphide tended to mask the effect of electrical conductivity test readings.

Write for details in Publication J.30.

The "Dionic" Water Purity Meter, Eversched-Straub Degassing Condenser and Eversched Chart Recorder installed by Rowntree & Co. Ltd., York. The recorder maintains a 24 hour a day chart record of steam purity measured by the "Dionic" instrument.

EVERSHED

EVERSHED & VIGNOLES LTD.

ACTON LANE WORKS, CHISWICK, LONDON, W.4

Telephone: Chiswick 3670 · Telegrams: Megger, Chisk, London · Cables: Megger, London.

6/95

CHANNEL CONDUIT

(Patented)

'SPRING CAPPED'

costs less to buy

less to install

and less to maintain

than any other trunking

Not only saves money on installation but has the great advantage that wiring can be inspected and if necessary changed at any time without trouble—simply spring off the capping. Channel Conduit has a special anti-vibration method of fastening; a rust-resisting zinc finish; and is made in sizes 1″ x ½″, 1″ x 1″, 2″ x 1″, 2″ x 2″, 3″ x 2″, and 4″ x 3″, with complete range of accessories.

Write for fully descriptive leaflet R.E.8

CHANNEL CONDUITS LTD · 11 VICTORIA STREET · LONDON, S.W.1

Telephone: ABBey 2027/8. *Telegrams:* "Chancon, Sowest, London"

Also at Rugby, St. Helens and Irvine, Scotland.

T2W9

CABLE MARKERS

Interlocking Type

The Critchley Interlocking Ferrule is a simple and economical solution to the problem of identifying cable ends where a wide range of markings is required

Leaflet on request

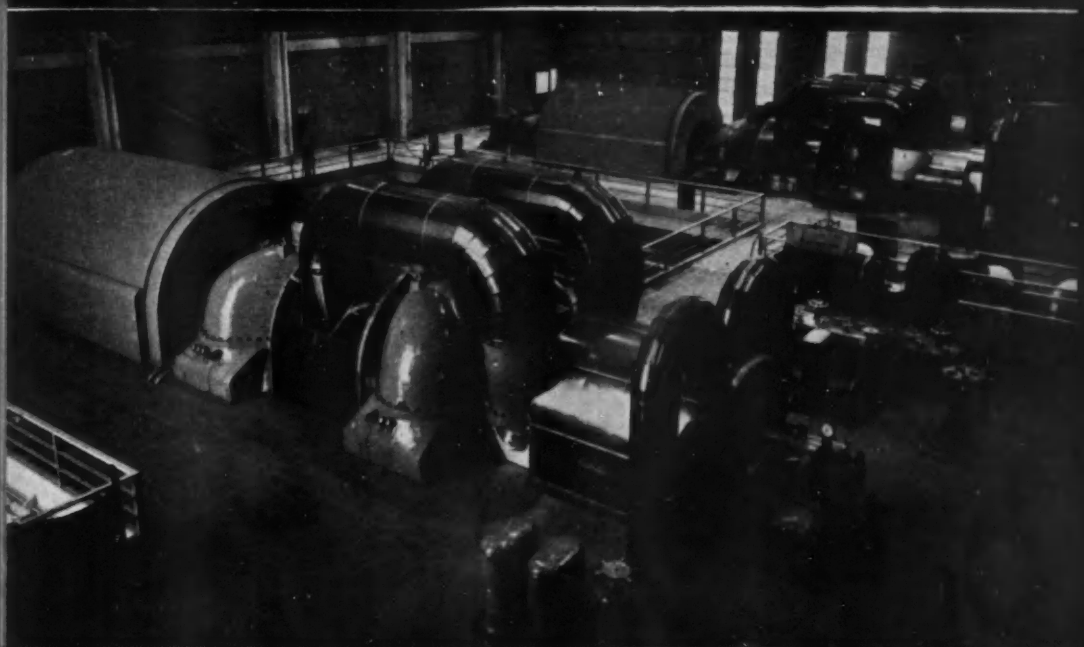
KEYED FOR PERMANENT ALIGNMENT

The patented key ensures that the ferrules can only be assembled with the figures in line and CANNOT COME OUT OF ALIGNMENT AFTERWARDS. Standard colours—Black, White, Red, Blue, Yellow and Green.

CRITCHLEY BROS LTD - BRIMSCOMBE - STROUD

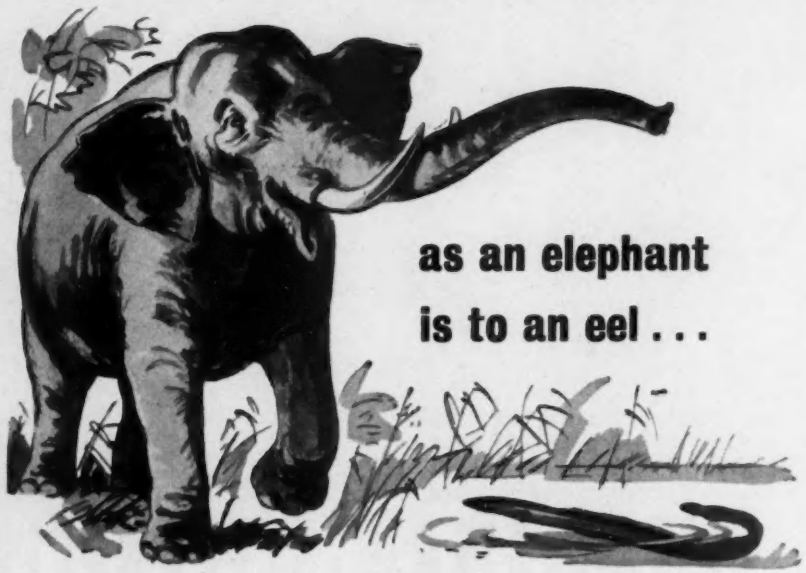
Telephone Brimscombe 2208

TURBO-ALTERNATORS



C. A. PARSONS & Co., Ltd.
HEATON WORKS · NEWCASTLE UPON TYNE, 6

GENERALLY SPEAKING . . .



— so is a GENERAL Heavy Duty Trailing Cable to a GENERAL Plastic Insulated Cable. With little surface resemblance, both are characterised by the right degree of strength, toughness and flexibility they need for their jobs. And it's the same with every one of the many standard types of cable which GENERAL manufacture . . . all are cables of quality, durability and fitness for purpose, qualifying our claim that " General Cables today prevent trouble tomorrow ".

GENERAL CABLES

MADE AT LEATHERHEAD

V.I.R. Taped, Braided and Compounded.
V.I.R. Lead Sheathed.
V.I.R. Tough Rubber Sheathed.
V.I.R. and Armoured.
Polythene insulated P.V.C. Sheathed Cables and Flexibles.
T.R.S. Flexibles.
Cotton and Silk Flexibles.
Workshop Flexibles.
Trailing Cable.
Welding Cable.
H.S.O.S. Cable.

The General Cable Manufacturing Co. Ltd., Leatherhead, Surrey. 'Phone: Leatherhead 3021/4.
Grams: " Isolde " Leatherhead.
Depots at: 204/206 Newhall St., Birmingham. 54a Newton St., Manchester. 55/63 Washington St., Glasgow, C.2.

Who is switching off the supply?

Are you? Do you realise that roughly half this country's supplies of new steel are made from scrap? That factories like yours are among the main sources of the raw material needed in the steel-works? It is vitally important that these sources should not be allowed to dry up.

Do not forget that scrap does not begin and end with the daily turnings in your machine shop. There is another form of scrap. Obsolete machines and equipment, redundant buildings, in fact everything containing iron and steel which has outlived its effective purpose—all this is scrap and should be sent off to your local scrap merchant as soon as possible.

Search your works for it and turn it in. You will be doing yourselves a great service.

Visit Stand No. 1

at the National Electrical Engineers Exhibition, Earls Court, March 25-28 — and see what STEEL is doing to help the national effort.

Issued for the STEEL SCRAP DRIVE, by the British Iron and Steel Federation and the National Federation of Scrap Iron, Steel and Metal Merchants

not just

a tall story

J. & P.

ALUMINIUM SHEATHED

V.I.R. CABLE

REALLY IS

. . . the cable with a conduit sheath

The lightness and strength of the aluminium sheath enables it to play the part of conduit in providing protection from mechanical damage and in reducing the need for supporting structures. But unlike conduit, J. & P. Aluminium Sheathed V.I.R. Cable

- requires no cutting and screwing of threads,
- eliminates the drawing-in of cable,
- completely *avoids condensation troubles.*

J. & P. Aluminium Sheathed V.I.R. Wiring and Control Cables afford a neat and pleasing appearance with economy of space, and are being widely specified for B.E.A. and other generating stations, oil refineries, steel works and other major industrial projects. Full details are given in Publication CD 31 which will be sent to interested engineers on request.

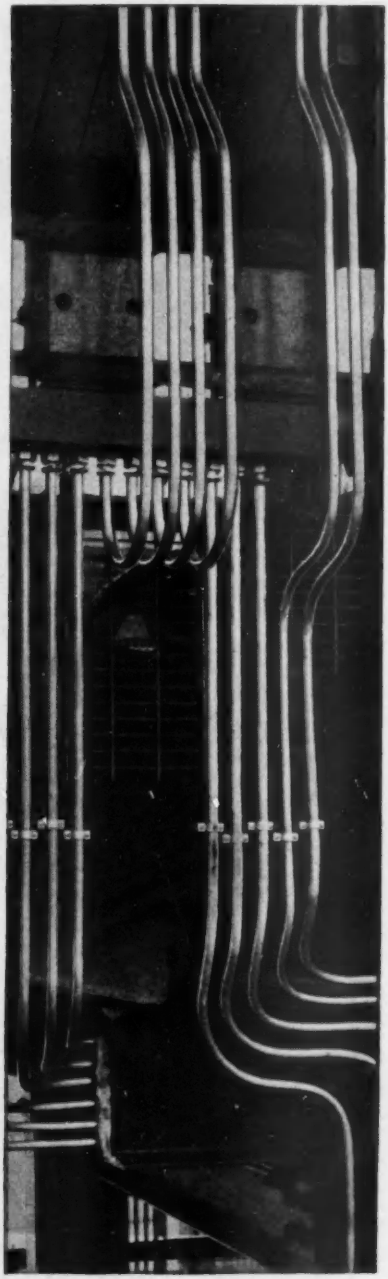
●

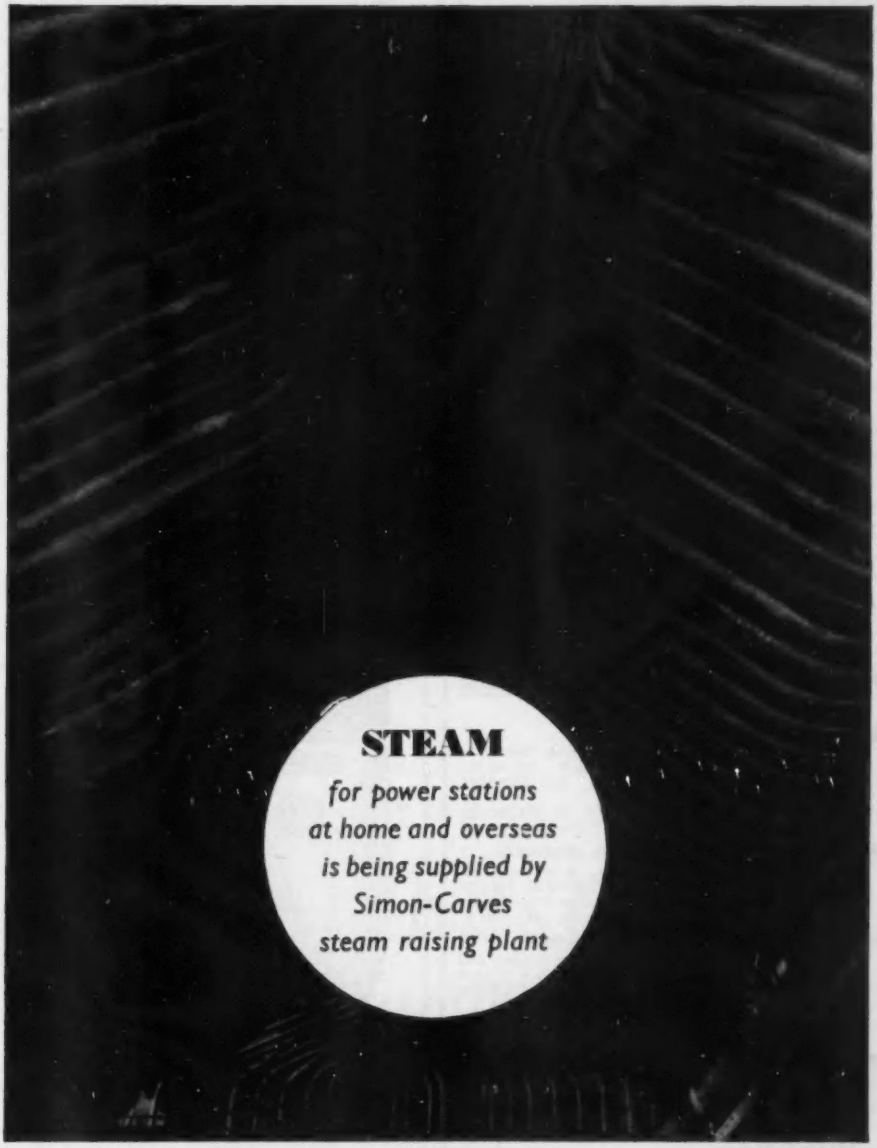
British Patent Nos. 627815 & 627793

JOHNSON & PHILLIPS LTD.

CHARLTON · LONDON S.E.7

ELECTRICAL ENGINEERS AND CABLE MAKERS SINCE 1875





A view from the ash pit, looking up into the combustion chamber of a 360,000 lb/hr Simon-Carves boiler during erection.

Steam power by Simon-Carves Ltd

S.C.76

STOCKPORT ENGLAND

IMMERSION WATER HEATERS

by "METWAY"

the Heating Specialists

2 and 3 kW in lengths 12"-42", 4kW in lengths 14"-42" Voltage range 100-120, 200-220, 230-250. Withdrawable elements, Thermostats, Circulators, mechanical or sweating Flanges.

PROMPT DELIVERY

Send today for our LIST No. MYJ/8/TE.

Please apply on Trade Heading enclosing 6d. in stamps to cover postage.

METWAY ELECTRICAL INDUSTRIES LTD.
KING STREET, BRIGHTON 1

Phone: Brighton 28366. Grams: "Metway, Phone, Brighton"

★ *We are exhibiting at* **British Industries Fair** Castle Bromwich. **STAND No. C. 225**

2 YEARS' GUARANTEE

PITMAN

Electric Wiring Diagrams
By W. Perren Maycock, Fourth edition, revised by A. Serner, B.Sc., A.C.G.I., A.M.I.E.E. An up-to-date and reliable reference book. 257 diagrams. 8/6 net.
"Clear and easy to follow."—INST. OF ELECTRICAL ENGINEERS STUDENTS' QUARTERLY JOURNAL.

Performance and Design of D.C. Machines
By A. E. Clayton, D.Sc.(Eng.). A textbook for students at Universities and Technical schools covering the syllabuses of the B.Sc.(Eng.), the I.E.E., The Higher National Certificates, etc. 25/- net.

Factory Organization and Management
By N. F. T. Saunders, B.Sc. An up-to-date and helpful book for factory managers, with a chapter on small-scale mass production. Third Edition. Illustrated. 16/- net.
"Has obviously been written with a background of practical experience."—ELECTRICAL REVIEW.

Radio and Radar Technique
By A. T. Starr, M.A., Ph.D., M.I.E.E. A book for designers and other advanced workers and students requiring a detailed account of methods and techniques. Profusely illustrated. 830 pages. 75/- net.

Cellulose Spraying
By John Howell Ousbey. A practical guide to the finishing and refinishing of automobile bodies and other metal surfaces with cellulose and synthetics. With hints on faults and their remedies, and technical information. 22 illustrations. 10/6 net.

PITMAN, *Parker Street, Kingsway, London, W.C.2*

Visidial
DEEP FAT
FRYER

Immersion oil heaters, anti-toxic, Admiralty bronze, halve the electric bill. Immense savings in fat or off-the-ration cooking oils. Variable thermostat with patented light-fail picture panel.

Approved for sale by London, South Eastern, Eastern, North Eastern Electricity Boards, etc., etc.

EVERY LARGE-SCALE KITCHEN
A POTENTIAL CUSTOMER

Send for catalogues to:

JOHN KELLY & SON
Head Office: 71 George Street, Edinburgh

RICHARD THOMAS & BALDWINS LIMITED

C cores AND SPIRAL cores

MANUFACTURED FROM

Alphasil

GRAIN-ORIENTED

LOW LOSS

TRANSFORMER STEEL STRIP

ALL MATERIAL MADE IN ENGLAND

COOKLEY WORKS, BRIERLEY HILL, STAFFS.
Head Office: 47 Park Street, London, W.1

FBC*
ALL-BRITISH
BALL AND PARALLEL-ROLLER BEARINGS
FOR EVERY PURPOSE
The illustration shows one of the Rotax aero engine starter motors in which our bearings are used.
F.B.C. :: FISCHER
FISCHER BEARINGS CO., LTD.
WOLVERHAMPTON
Fischer Bearings Company Ltd. and Timken-Fischer Stockists Ltd., Birmingham, are both subsidiaries of British Timken Ltd.
*Trade Mark

'VARIAC' voltage regulating transformers

Reg'd Trade Mark

'VARIAC' infinitely variable voltage-regulating transformers are designed and constructed for many years of trouble-free operation. Not only do they supply perfectly smooth control of voltage from zero, but many types (including 100-R) also furnish output voltages considerably above line voltage while the 100-RM/2B is a dual output type. Illustration left shows Type 100-R, Rating 2,000 va., Input Voltage 230/115, Output Voltage 0-270.

Left—Type 200 C.U.H.

Right—Type 50-B.

SERIES 100 'VARIAC' TRANSFORMERS.

Type	Load Rating	Specifications				No-Load Loss	Net ♣ Price ♣
		Input Voltage	Current Rated	Current Maximum	Output Voltage		£ s. d.
100-K	2000 va.	115	16 a.	17.5 a.	0-115	20 watts	17 17 0
100-KM	2000 va.	115	15 a.	17.5 a.	0-115	20 watts	18 12 0
100-L	2000 va.	230/115	8 a.	9 a.	0-230	25 watts	17 17 0
100-LM	2000 va.	230/115	8 a.	9 a.	0-230	25 watts	18 12 0
100-Q	2000 va.	115	15 a.	17.5 a.	0-135	20 watts	18 9 0
100-QM	2000 va.	115	15 a.	17.5 a.	0-135	20 watts	19 6 0
100-R	2000 va.	230/115	8 a.	9 a.	0-270	30 watts	18 9 0
100-RM	2000 va.	230/115	8 a.	9 a.	0-270	30 watts	19 6 0
100-LH	1200 va.	480/240	2 a.	2.5 a.	0-480	25 watts	21 15 0
500-L ‡	1450 va.	100	8 a.	9 a.	0-100	25 watts	17 17 0
2000-K †	1000 va.	125	8 a.	9 a.	0-125	25 watts	17 17 0

* For 500 cycles † For 2,000 cycle service ‡ All 'VARIAC' prices plus 20% as from 23rd Feb. 1952

Prompt Delivery

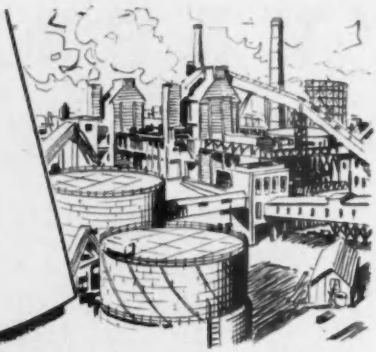
Write for catalogue V549 which gives full details of 'VARIAC' transformers and suggestions for use.

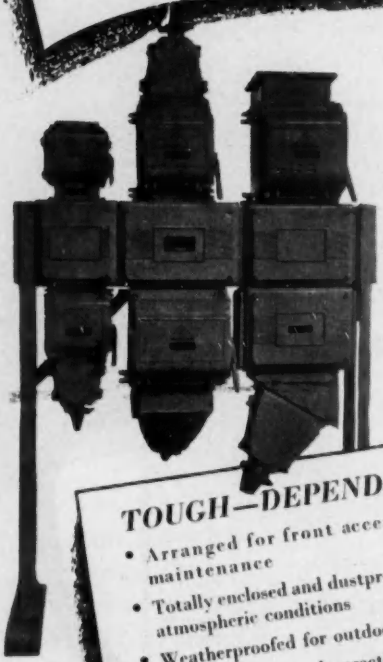
CLAUDE LYONS LIMITED

ELECTRICAL AND RADIO LABORATORY APPARATUS, ETC.

180 Tottenham Court Road, London, W.1; and 76 Oldhall Street, Liverpool, 3, Lancs.

A FINE SWITCHBOARD for a REALLY TOUGH JOB!

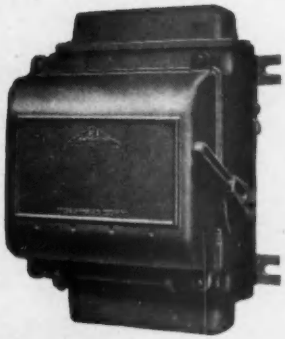




Here's a ruggedly constructed, metal-clad switchboard, designed for heavy duty under the most arduous conditions . . . built of standardized units for quick, easy extension, Lancashire Dynamo Heavy Industrial 'Unit to Unit' Switchgear provides an efficient and dependable method of controlling the distribution of low tension electrical energy in industry. The flexibility of the 'unit to unit' feature enables any subsequent extensions which may be needed, to be carried out quickly and economically. All switchboards are built up from standardized fuse switches and bus-bar chambers with standard type cable boxes.

TOUGH—DEPENDABLE!

- Arranged for front access for easy maintenance
- Totally enclosed and dustproof for severe atmospheric conditions
- Weatherproofed for outdoor service
- Designed for speedy erection on site



LANCASHIRE DYNAMO SWITCHGEAR LTD

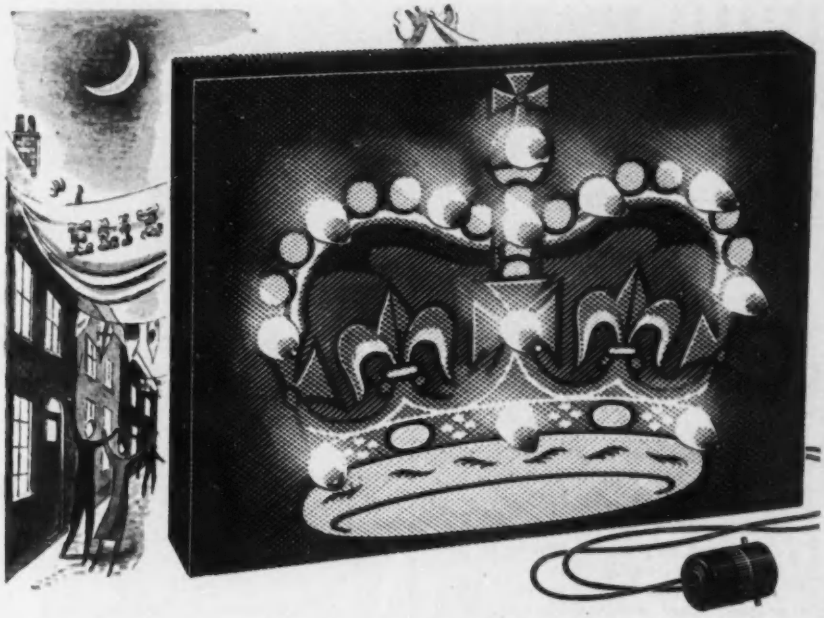
BRISTOL ROAD · BRIDGWATER · SOMERSET

TELEPHONE: BRIDGWATER 2614 · TELEGRAMS: CRYPTOQUIP BRIDGWATER

A MEMBER OF THE LANCASHIRE DYNAMO GROUP OF COMPANIES

H.I. SWITCHGEAR

S.G.13

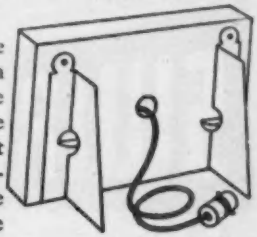


Coronation Lighting for Everyone

Brilliant Mazda dual-purpose set-piece costs only 26/3d.
(including purchase tax)

TO PROVIDE CORONATION LIGHTING for all the nation's shops and homes at a price everyone can afford, Mazda have produced a special Coronation Lighting Set in the form of a magnificent crown in full colour, studded with gay red, white and blue Mazda lamps.

Ready-wired for immediate use on mains voltages, the dual-purpose display box is made to stand or hang as required. The lamps can of course be removed from the box and festooned in the usual manner. No additional wiring is necessary.



After the Coronation the box can be used to store the lighting set until it is required for the Christmas tree

Mazda

lamps stay brighter longer

B T-H

4442

THE BRITISH THOMSON-HOUSTON CO. LTD., Crown House, Aldwych, London, W.C.2.
(Member of the A.E.I. Group of Companies)

"Have you heard the latest..?"

... about Swirlux Washing Machines ...

we shall be glad to forward up-to-date information on request. Manufactured to meet present day markets by the makers of the famous 'Versco' Range of Wash Boilers.

Universal Boilers & Engineering Company Ltd. Burnley, Lancs.

Phone: 3121-2, 3203

SWIRLUX REGD.

n.d.h. 601

He always said...

"Never give a guarantee without a loophole in it."

* Inspired by the well known "Yachting World" aphorisms appositely modified by

SANDERS
WEDNESBURY

Magnetic Tachometers by SMITHS

- Each instrument is individually manufactured and calibrated.
- MAGNETIC TACHOMETERS. 1½ in., 2½ in., 4 in., 4½ in., 5 in., 6 in. or 9 in. dials. 5 or 6 figure counters may be incorporated in sizes of 4 in. and above.

Other Smiths Tachometers include Hand Tachometers, 2-way Revolution Indicators, Cutting Speed Indicators and Feet-per-minute Indicators.

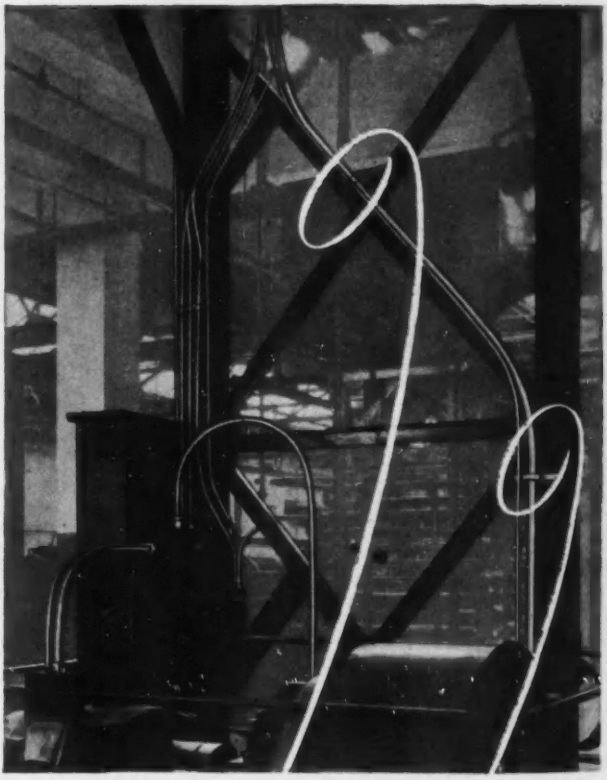
SMITHS

SMITHS INDUSTRIAL INSTRUMENTS LTD.

CRICKLEWOOD WORKS, LONDON, N.W.2

The Industrial Instrument Division of S. Smith & Sons (England) Ltd.

188-70



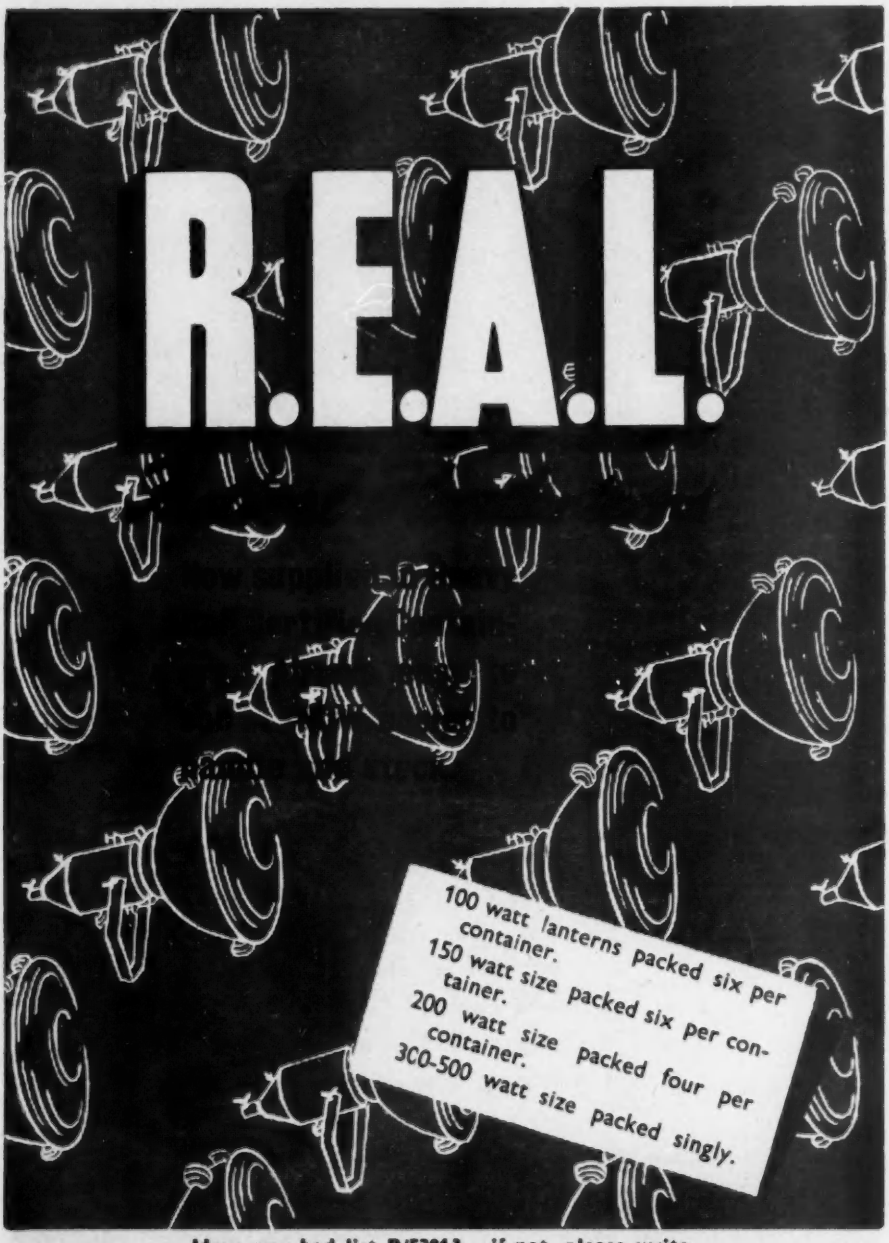
One! Two!

. . . it's surprising how few

. . . supports are required for J. & P. Aluminium Sheathed Cables. The lightness and strength of the aluminium sheath greatly facilitates erection and reduces cost considerably.

British Patent Nos. 627815 & 627793

JOHNSON & PHILLIPS LTD.
CHARLTON LONDON S.E.7
The mark that means that "little more" in quality


R.E.A.L.
100 watt lanterns packed six per container.
150 watt size packed six per container.
200 watt size packed four per container.
300-500 watt size packed singly.

Have you had list P/5301?—if not, please write

Issued by Rowlands Electrical Accessories Ltd., R.E.A.L. Works, Birmingham, 18

Precision in process control

The Ignitron is designed for precision control of processes involving the use of comparatively low voltages and high currents — for example, resistance welding and X-Ray exposure control. It exhibits some important advantages over other methods; the ignitron combines the precision and freedom from mechanical problems of the thermionic valve with the robustness of the contactor; it is compact, moderate in weight and has a long life.

'ENGLISH ELECTRIC' Ignitrons are made in a range of standard sizes, interchangeable with all other types in common use. They can be water-cooled and are suitable for line voltages of 250-600 volts.

'ENGLISH ELECTRIC' ignitrons

THE ENGLISH ELECTRIC COMPANY LTD., Queens House, Kingsway, London, W.C.2
Rectifier Sub-station Department, Stafford

WORKS: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL · ACCRINGTON

I.G.I

In heating elements

HIGH TEMP. is one thing

LONG LIFE is another

There is no great difficulty in making a nickel-chromium wire which will stand up for a comparatively short period to working temperatures in excess of 950° C or 1150° C. Neither is it difficult to make a wire with long life at only moderate temperatures. It is when you want both—long life at continuously high temperature—that 'NICHROME' is your wire.

Please remember: For **domestic heaters and appliances** *up to 950° C. (1742° F.) it is* **'NICHROME'.** *For* **heavy duty heating** *up to 1150° C. (2102° F.) over long periods it is* **'NICHROME' V.**

and if you want both

'NICHROME' is your wire

BRITISH DRIVER-HARRIS COMPANY LTD

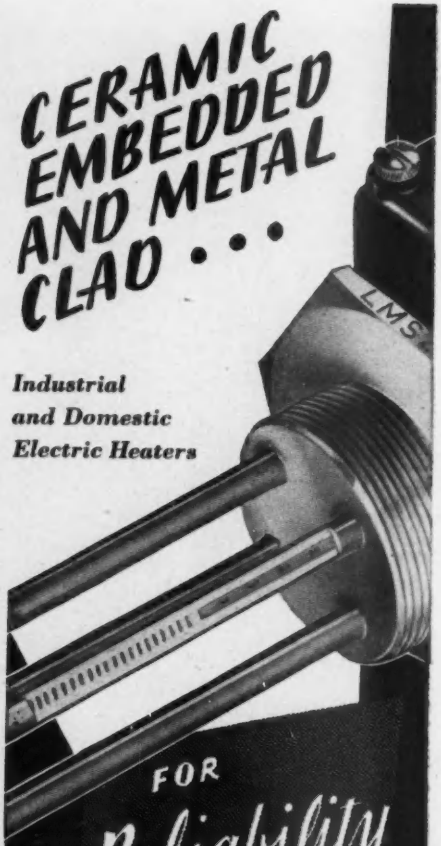
MANCHESTER 15

THE GREATEST NAME IN ELECTRICAL RESISTANCE

"NICHROME"

CERAMIC EMBEDDED AND METAL CLAD . . .

Industrial and Domestic Electric Heaters



FOR *Reliability*

BRAY

GEO. BRAY & Co LTD.
LEICESTER PLACE, LEEDS 2
PHONE 20981 (3 LINES) GRAMS BRAY LEEDS

G.E.C. ELECTRIC FIRES
FITTED WITH SAFETY GUARDS
All G.E.C. Electric Fires comply with B.S.1670 "Safety Requirements of Electric Fires"
Selections from the range
ELECTRICITY ENSURES TRUE COAL ECONOMY

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

C

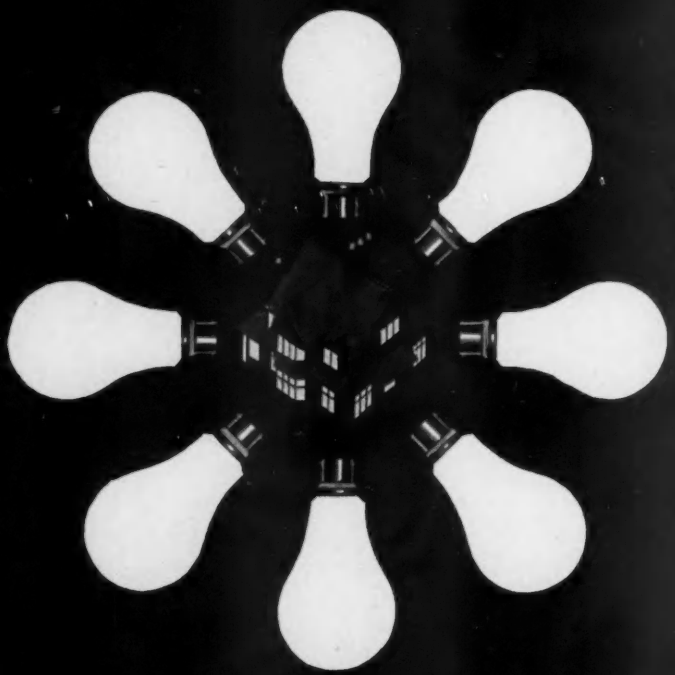
SUPPLIERS OF ELECTRIC LAMPS

THE EDISON SWAN ELECTRIC CO. LTD.

ROYAL

"EDISWAN"

LAMPS



THE EDISON SWAN ELECTRIC CO. LTD. 155 CHARING CROSS RD., LONDON, W.C.2. & BRANCHES

Member of the A.E.I. Group of Companies

They'll want a BERRY fire this weather!

Foul weather in the street outside only makes the warm room more secure, the dancing firelight more delightful.

NO. 450 CRESTABERRY, the new model with a specially cheering coal effect. Finished in Warm Silver with polished rustless feet, front bars and radiant heat reflectors, the 2 kW. Crestaberry is fitted with a special Safety Guard.

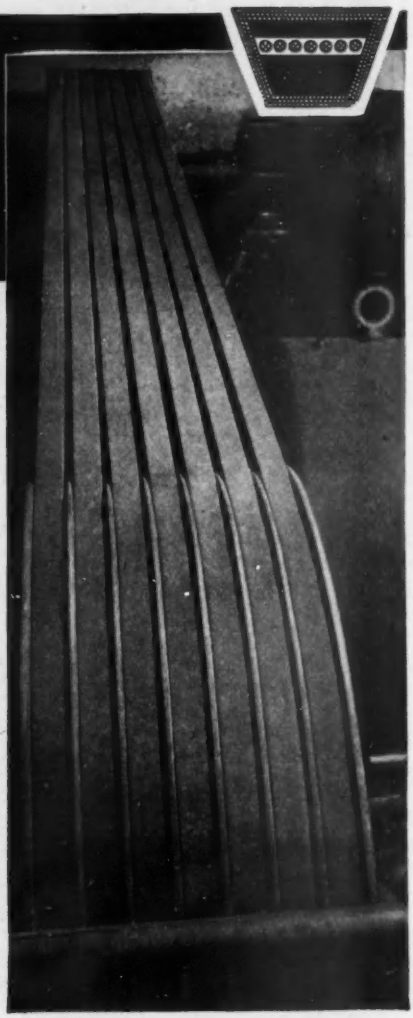
Berrylog A.21/S, a log fire on traditional lines, is supplied in Satin Antique finish. Heating is 1,500 W. independently controlled by a foot switch.

Both models comply in all respects with the latest B.S. specification.

Berry's MAGICOAL FIRES

TOUCHBUTTON HOUSE · NEWMAN STREET · LONDON · W. 1

7 (endless) reasons



- Single line of endless high-tensile cords takes the direct pull of the drive without stretch.
- Endless cords are embedded in a supporting cushion of gum rubber, absorbing internal friction.
- Specially compounded rubber cushions above and below line of cords take tension and compression.
- Bias-cut outer covering of cotton duck—a wear-resisting, non-slip, enduring surface.
- Turners Cord V Belts, because of special construction, stand up to sudden shock loads without deterioration.
- Accuracy of size and shape, lack of slip, and enormous strength give high horse-power transmission.
- A smooth, compact, silent drive.

Makers also of Rubber and Balata Power Transmission Belting; Conveyor Belting; Endless Whipcord Belts.

TURNERS

CORD V BELTS

MADE TO B.S.S. 1440/1948

TURNER BROTHERS ASBESTOS CO. LTD., ROCHDALE, ENGLAND

A MEMBER OF THE TURNER & NEWALL ORGANISATION

V.23.

Ask your wholesaler –

for

Volex

PLASTIC

SHADES

Where reliable and efficient lighting is essential, fit "VOLEX" Shades—your wholesaler can supply. Designed to provide maximum illumination and even distribution of light without glare. They are robustly constructed and will withstand many years of use without discoloration. WHITE FINISH.

Widely used by Government departments, Air Ministry, County Councils, Public Authorities and leading industrial concerns.

Ideally suitable for use in Offices, Factories, Hospitals and Schools, etc.

Send for illustrated leaflet and Price List.

BETTER QUALITY SHADES AT LOWEST PRICES

VOLEX ELECTRICAL PRODUCTS LTD
SALFORD.6.

Telephone: PENdleton 4373 *Telegrams:* "VOLEXPROD" Salford 6

VENNER LIMITED, Kingston By-Pass, New Malden, Surrey
Telephone: MALden 2442

All the best features in electric switch design and construction are embodied in Temco Switches to give you high efficiency, safety and long service.

Temco Switches are available in surface, semi-recessed and flush-fitting styles and in brown on white, all brown or all white finishes.

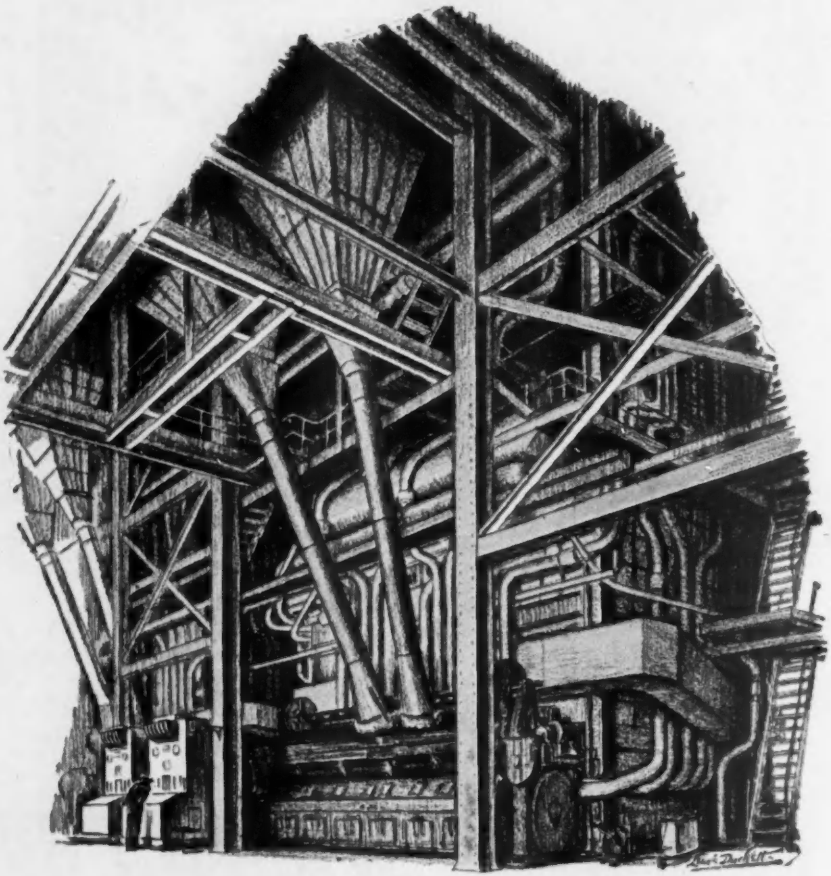
You will find our complete Accessories Catalogue very useful for quick reference. Let us send you a copy.

TEMCO

ELECTRICAL ACCESSORIES

T. M. C.—HARWELL (SALES) LTD.
37 UPPER BERKELEY STREET, LONDON, W.1
Telephone : Paddington 1867/8/9

YARROW



WATER TUBE BOILERS

YARROW & CO LTD SCOTSTOUN GLASGOW

No. 10

ESSEX BEAUTY SPOTS

The illustration and information are taken from "Journeying into Essex," by W. R. Finch —printed by S. E. Recorders Ltd., Ilford

EPPING

A FOREST in which Boadicea fought and Dick Turpin roved. Bought by the Corporation of the City of London for £250,000 and declared a permanent open space by Queen Victoria in 1882.

ESSEX is also the home of:

THE METROPOLITAN ELECTRIC CABLE & CONSTRUCTION Co. Ltd.

CLYDE WORKS, CHADWELL HEATH, ESSEX

Tel.: SEVEN KINGS 1810 **Grams.: METROCABLE**

Pultra micro lathes

first they are lathes

but their extreme robustness and the

multi-purpose equipment

which Pultra have created, gives a

versatility

far beyond that of ordinary machines.

IT'S WELL WORTH A POSTCARD FOR BROCHURE P17/CA8/3 TO SEE PRECISELY WHAT WE MEAN

PULTRA LIMITED
24 GRAVEL LANE, SALFORD 3, MANCHESTER

CW 2011

SIFAM Precision INSTRUMENTS

TYPE M35

4½" Square: Also TYPE M 202 2" Square

The choice of leading electronics equipment designers

A first-grade B.S.I. moving-coil panel mounting instrument, supplied as D.C. Microammeter, Milliammeter, Ammeter, Millivoltmeter, or Voltmeter. Also available as A.C. Voltmeter for frequencies up to 50,000 c/s, A.C. Ammeter with internal transformer, or R.F. instrument with internal thermocouple.

For full details of this and other SIFAM Instruments 2" to 8", write for our new catalogue S/10.

SIFAM ELECTRICAL INSTRUMENT CO. LTD.
LEIGH COURT, TORQUAY Telephone: Torquay 4547-8

SAX

ALARM BELLS

3" to 10" dia GONG WEATHERPROOF IRONCLAD ALARM BELLS

PROMPT DELIVERY

JULIUS SAX & CO. LTD.
24 COMMERCE RD., BRENTFORD
TELEPHONE: EALING 6034-5 ENG.

SPECIAL

Cables

C.M.A. MEMBERS WERE THE FIRST WITH :

The Co-Axial Cable for Television

Multi-Circuit Cable and Couplers giving greater mobility for Television Cameras and Apparatus.

Specially designed Cables for use in X-Ray Apparatus.

MEMBERS OF THE C.M.A. & AFFILIATED MANUFACTURERS' ASSOCIATIONS

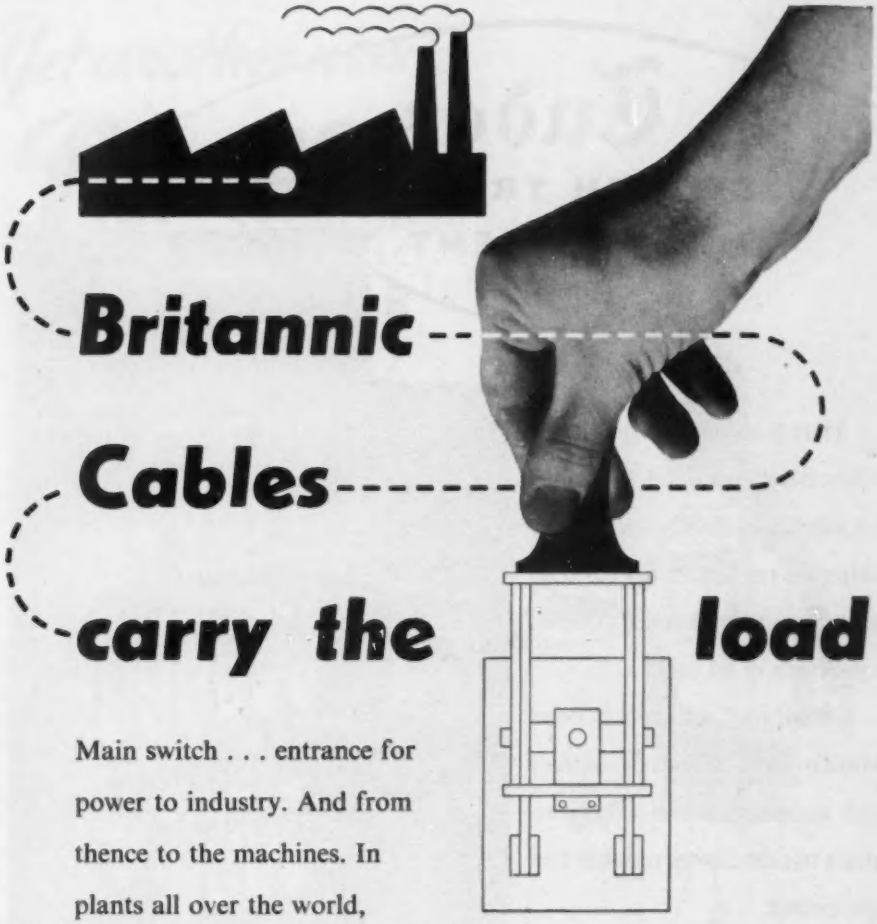
British Insulated Callender's Cables Ltd.
Connollys (Blackley) Ltd.
The Craigpark Electric Cable Co. Ltd.
Crompton Parkinson Ltd.
Enfield Cables Ltd.
The Edison Swan Electric Co. Ltd.
Greengate & Irwell Rubber Co. Ltd.
W. T. Glover & Company, Ltd.
W. T. Henley's Telegraph Works Co. Ltd.
Johnson & Phillips Ltd.
Liverpool Electric Cable Co. Ltd.
Metropolitan Electric Cable & Construction Company Ltd.
Pirelli-General Cable Works Ltd. (The General Electric Co. Ltd.)
Siemens Brothers & Co. Ltd. (Siemens Electric Lamps & Supplies Ltd.)
St. Helens Cable & Rubber Co. Ltd.
Standard Telephones & Cables Ltd.
The Telegraph Construction and Maintenance Co. Ltd.

CABLE MAKERS ASSOCIATION
52/54 HIGH HOLBORN, LONDON, W.C.1. TELEPHONE: HOLBORN 7633

We are specialists in the manufacture of Power Transformers for Generation, Transmission and Distribution. Every transformer is entirely manufactured in our own works. Ratings up to 60,000 kVA. Voltages up to 132,000 volts.

Yorkshire Electric Transformer Co Ltd

THORNHILL, DEWSBURY, ENGLAND Phone: DEWSBURY 1691-2



Britannic Cables carry the load

Main switch . . . entrance for power to industry. And from thence to the machines. In plants all over the world, you'll find Britannic Cables doing their job faithfully, unfailingly. Product of an independent company—and priced to meet any competition.

We make cables for power supply, for mining, for light and heavy industrial needs and for domestic uses. The range is always extending.

BRITANNIC ELECTRIC CABLE & CONSTRUCTION CO LTD · IVER · BUCKS

Tudor
SWITCH TRIPPING EQUIPMENT

Here is a completely reliable equipment, designed by Tudor for small installations where the battery is required only for tripping circuit breakers, usually at a pressure of 24 or 30 volts.

The cabinet, which may be of wood or steel, houses the battery and accessories and incorporates a trickle charge rectifier and test circuit.

Full details in TUDOR SWITCH TRIPPING Leaflet No. 85
Sent on request

T.113

Tudor BATTERIES

THE TUDOR ACCUMULATOR COMPANY LTD · 137 VICTORIA STREET · LONDON · SW1

Yet another new

Burco

CABINET TYPE

ELECTRIC

WASHBOILER

—with wringer!

(Available in cream or white)

For the woman who wants an efficient, good-looking washing unit, but cannot afford an all-electric washing machine, this BURCO Washboiler has the answer.

Sell this new model E900 with or without the Acme Wringer—if the housewife already possesses a 14" Wringer, this will fit on the back of the boiler.

The story of BURCO efficiency is unchanging—merely adapted to present-day needs for practicability with economy.

Offer this new BURCO model now and take advantage of this timely feature !

NO PURCHASE TAX

ENQUIRE NOW !

BURCO LTD · ROSE GROVE · BURNLEY

LANCS

Also makers of the famous Burco all electric washing machine

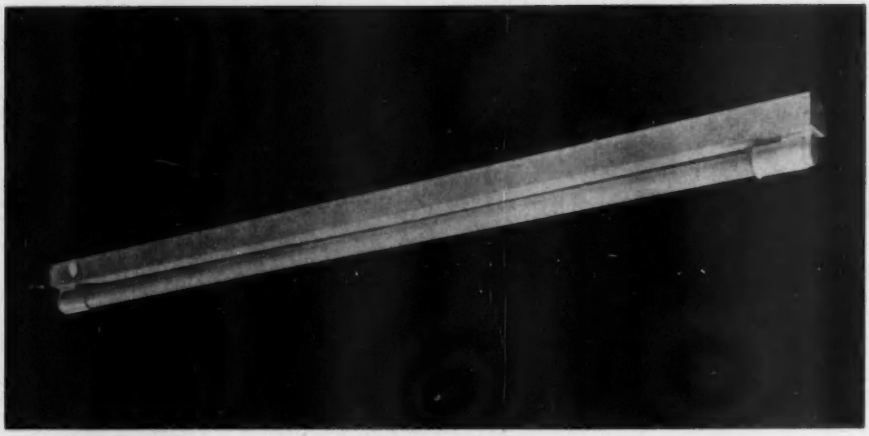
new

SIERAY
MADE IN ENGLAND

FLUORESCENT BATTEN FITTING

80 WATT, 5 ft.

F.T.F. 5231



USE SIEMENS TUNGSTEN FILAMENT AND SIERAY FLUORESCENT LAMPS

- Robust sheet steel construction
- Bonderised and stove enamelled
- New low loss control gear encased in fitting
- Retractable lampholders
- Knockouts for ¾" conduit on top of fitting and at each end

PRICE *complete (excluding lamp)* **£5/10/0**

Write for CATALOGUE No. 1020 giving complete range

Advt. of **SIEMENS ELECTRIC LAMPS & SUPPLIES LIMITED, 38/39 Upper Thames Street, London, E.C.4**
Branches at: Belfast, Birmingham, Bristol, Cardiff, Dublin, Edinburgh, Glasgow, Leeds, Liverpool, Manchester Newcastle-on-Tyne, Nottingham, Sheffield

ELECTRICAL TIMES

Volume 123 No. 3199 26 FEBRUARY, 1953

PUBLISHED EVERY THURSDAY

HEAT OFF THE PEAK	377
THERMAL STORAGE HEATERS	381
OUR READERS' VIEWS	382
INTERFERENCE SUPPRESSION	382
CIRCUITS FOR FLUORESCENTS	383
TROUBLES ON GAS-TURBO LOCOS.	386
AN ALL-GAS TURBINE TANKER	387
MEASURING BLADE CLEARANCES	388
FROM AN ENGINEER'S NOTEBOOK	389
PROBLEMS AND PRACTICE IN ENGINEERING	390
INVENTIVENESS TODAY	392
TARIFF CHANGES IN SOUTH-EAST SCOTLAND	392
ORDERS AND OUTPUT, 1952; BABCOCK AND WILCOX LTD.	393
INFRA-RED AND CAR PRODUCTION	395
POWER SUPPLY IN JANUARY	396
THE FARADAY LECTURE	398
DOMESTIC FITTINGS IN THE CONTEMPORARY STYLE	399
OVERSEAS NEWS	400
PERSONALITIES IN THE INDUSTRY	402
NEW LITERATURE	404
EXPORTS AND IMPORTS	405
THE BUYER'S COLUMN	406
ELECTRICITY AND EYE SURGERY	408
BRITISH STANDARDS	409
THE WEEK IN NEWS	410
Questions in Parliament	415
Company Activities	415
Electric Supply News	417
COMMERCIAL INFORMATION	418
CLASSIFIED ADVERTISEMENTS	65
INDEX TO ADVERTISERS	74

Editor and Managing Director
ROY BALDWIN
M.I.E.E., Barrister-at-Law

Assistant Editors;—
J. K. JOHNSON
B.Sc. (Eng.), A.M.I.E.E.

K. C. POUNDS
B.Sc. (Eng.), A.C.G.I.

ESTABLISHED 1891

SUBSCRIPTION RATES—United Kingdom and Overseas £2 10s. 0d. per annum. Canada C$7·50c., U.S.A. $7·50c. per annum. Subscriptions are payable in advance and may commence with any issue throughout the year. Overseas subscriptions may be paid to The Electrical Times Limited by banker's draft, cheque or international money order. Single copies are obtainable, price 9d. each.

SARDINIA HOUSE, SARDINIA ST., LONDON W.C.2

Telephone: HOLborn 6016 Telegrams: EQUIVOLT, ESTRAND

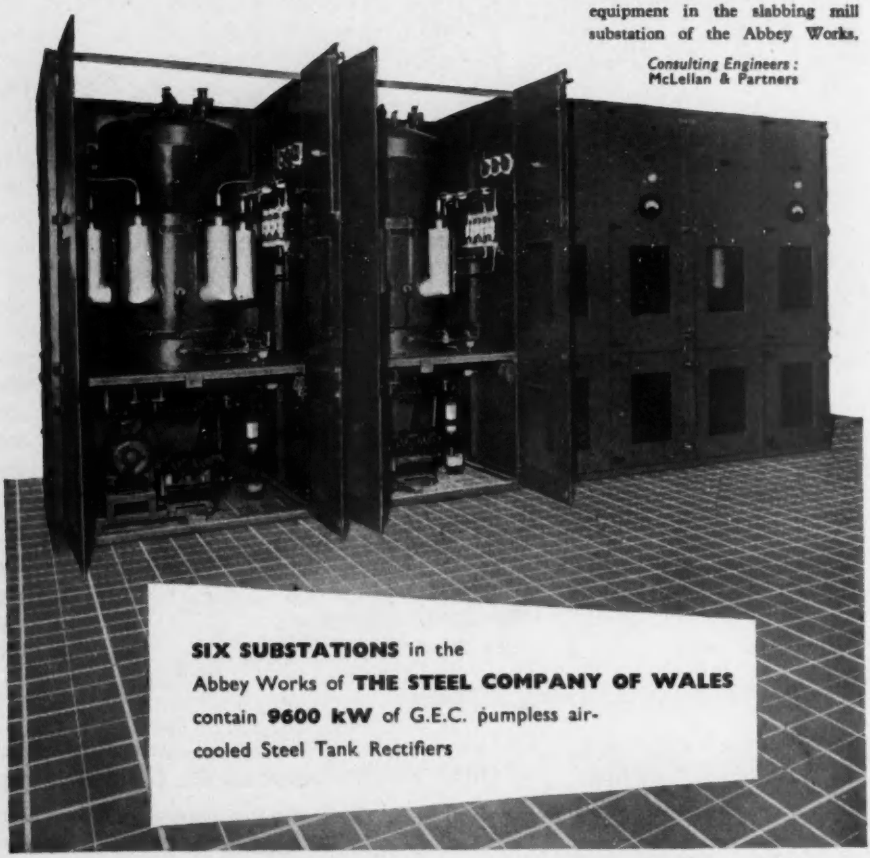
G.E.C.

Steel Tank Rectifiers

FOR STEELWORKS

1600 kW, 440 volt G.E.C. rectifier equipment in the slabbing mill substation of the Abbey Works.

Consulting Engineers: McLellan & Partners



SIX SUBSTATIONS in the Abbey Works of **THE STEEL COMPANY OF WALES** contain **9600 kW** of G.E.C. pumpless air-cooled Steel Tank Rectifiers

THE GENERAL ELECTRIC CO., LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

Editorial

HEATING FOR SALE

THIS week we are featuring in these pages the electrical thermal storage heater, a compact and convenient appliance which is now freely available. It well merits such special attention, for it is a long time since so favourable an opportunity for a trouble-free increase in sales has been presented to the electricity supply industry. Here is an appliance which has given satisfaction in service in some hundreds of installations and which presents an occasion for extolling the many virtues of electric heating without the temptation to glance backwards at the threatening spectre of a peak-load problem. Already some electricity boards are actively encouraging this form of storage heating by such propaganda as they are permitted and, more directly, by offering favourable tariffs for the night-demand that these heaters bring. With relief from a heavy burden of purchase tax, the time has arrived for a concentrated effort by all boards to build up this desirable load, which is essentially an attraction for commercial and, to a lesser extent, industrial consumers. An all-out selling campaign is needed and is justified; the special effort that is possible when the salesman is sure of the merits of his case. In this form electric heating, by all calculations of economy and comfort, can serve the best interests of everyone. The immediate need is that everyone be told.

TARIFFS CAN HELP

THERMAL storage heaters need tariff concessions if they are to be developed to the full extent that they deserve. Some boards are providing appropriate special night rates, as mentioned above, and it is likely that this practice will be widened as a result of discussions which, the Minister of Fuel and Power stated recently, he is having with the B.E.A. These are specifically concerned with alterations in tariff policy to give further encouragement to off-peak consumption. This is, of course, an old theme, and one that extends far beyond the consideration of any single type of appliance. Its reconsideration is a welcome sign of the increased willingness of the authorities to encourage demand, for such special arrangements have proved in the past a powerful weapon in the fight for business. The difficulties that have always attended the development of this type of tariff, so far as control and metering are concerned, remain, more particularly as regards domestic and the smaller commercial installations, but an acceptable solution can be found if the desire is there. With fuel costs due to rise again shortly, there is an urgent need to take every opportunity to reduce overall cost per unit by increasing demand at the right time. Off-peak tariffs will help, and they should be mobilised for this purpose.

FLUORESCENTS IN FAVOUR

THE fluorescent lamp has provided another success story of the electricity industry by its progress in recent years. To this, its ready acceptance in industry, commerce and, to an increasing extent, the home, gives convincing testimony, yet few realise the amount of work that has gone into its development. Both tube design and the arrangement of circuits and fittings have made considerable advances, and the general review of the characteristics and problems of available circuits, given to the I.E.E. last week, did not lack for variety of subject matter. The impression left, both by the paper and by the lengthy discussion to which it gave rise, is that of a steady advance by the fluorescent lamp towards the versatility and simplicity which are the hallmarks of the incandescent lamp. For the former quality it has at present to rely on a large number of special circuits, ingeniously developed to give the varied electrical and physical characteristics demanded in the wide range of

situations in which electric lighting is used. For most applications, however, the premier demand is for simplicity, and this is answered by the prevailing trend away from starting switches of various types towards the static components of the so-called instant-start circuits. This progress towards reliability, with its rewards of decreased maintenance and easier fault-finding, should extend still further the use of the fluorescent lamp.

NOTHING OVER FIFTY

IN one respect this spread of fluorescent lighting is unwelcome to the supply industry. In common with all gas discharge devices, the fluorescent lamp is an ample generator of harmonics, and such distortions of waveform have always been unpopular. Undesired results range from the heating of distribution transformer windings, with reduction of useful capacity, to interference with ripple and similar control systems by the higher frequency components. There is also some danger from overheating of power-factor correction capacitors installed to overcome another operating problem. Fluorescent lamps are by no means the only offenders, and they have in their favour the fact that skilful design of control gear can minimise the trouble they cause, but their extending use does add urgency to the question of how much longer there can be the present freedom to distort the supply. Drastic powers are available under the Electricity Acts to take action when there is interference with other consumers, but these are unlikely to be invoked to correct any widespread difficulty. One suggested answer is a statutory limitation of the harmonic content of each consumer's current wave to some practicable level. Something of this nature has been attempted in France, and it will be interesting to learn of the experience, over the years, of meeting the many problems which must arise in administering such a rule. In this country there is a traditional opposition to compulsion, but obviously the subject is one which must be kept under constant review.

QUALITY IN SUPPRESSION

RADIO suppression capacitors and inductors, like all components incidental to the main purpose of an appliance, have to be relatively inexpensive. Whether this need drives manufacturers too far along the trail of light construction is a matter deserving of careful consideration, for the range of sturdiness which we have seen in some domestic apparatus is rather disturbing. We are reminded of this doubt by the draft Code of Practice on interference suppression which has recently been released for comment by the joint B.S.I./I.E.E. committee responsible for its preparation. This code is still subject to modification in the light of the criticism that is being invited, so the time has not yet arrived for general comment on what promises to be a most valuable technical document. It is noticeable, however, that it gives detailed attention to the limiting value of capacitors permissible in given circuits from considerations of shock risk. When the code comes to be applied, this concern with one aspect of safety must be backed by a corresponding quality of the components used. There is a British Standard, now in the course of revision, which deals with this matter, and early attention by manufacturers is important. The compromise between quality and cost must not be pushed too far in the direction of flimsy construction, because service in domestic surroundings can be strikingly arduous on occasion.

COLD BEES and C.T.s

PERHAPS the "Problems and Practice" page is the right place for this story, but we cannot resist repeating here the stratagem used by Iowa, U.S.A., engineers who found a swarm of bees in occupation of a current transformer box. According to one report, they "froze" the bees temporarily with CO_2 from a fire extinguisher. By the time the bees were hotted up and active once again, necessary adjustments to the transformer connections had been made, and the engineers had departed to the next job.

Meteor

Heat off the Peak

THERMAL STORAGE HEATERS, FREE OF TAX ARE DOUBLY ATTRACTIVE

OFF-PEAK loads are always an attractive proposition for the supply industry. Electric heating, with its cleanliness and general convenience has proved advantages in every sphere of application. When the two combine in a neat and economical device which receives favourable treatment in terms of taxation compared with other electrical products, then a development of the first importance has occurred. This is the hopeful outlook for the electric thermal storage heater, which is being marketed throughout the country. It is being tested by several area boards, and actively encouraged by propaganda and by favourable tariffs in the areas of the Eastern and London Boards.

Fig. 1 Component blocks of the G.E.C. heater being assembled

A Simple Idea

The thermal storage heater is essentially simple in conception. During the night hours, a block of refractory material is heated by an electric resistance element. Subsequently, during the day time, the current is switched off, but the thermal capacity of the block, together with that of the building fabric which has been maintained at a comfortable temperature throughout the night, is sufficient to supply heat losses to the outside air without a material fall in inside temperatures. Thus comfortable conditions are ensured for the occupants of the room concerned, but no electrical load is imposed during the peak hours of the supply system.

Heaters

At present two designs of free standing heater are available in this country, one marketed by the General Electric Co., and the other by Aberdare Electric Co., Ltd., of Eire. The usual rating is 1½ kW, an electric resistance element being embedded in a block of refractory

Fig. 2. Aberdare Electric "Thermodare" heaters are seen here in one of the principal rooms of the Eire Embassy in London

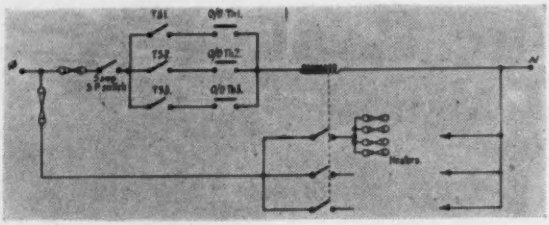


Fig. 3. This method of controlling storage heaters involves the use of outdoor thermostats in conjunction with time switches to alter the heating period as required by ambient conditions

material. The whole assembly enclosed in an attractively finished sheet-steel case. A fuller technical description of the heaters is given on page 381.

Performance

For the most comfortable conditions in a heated room, it is necessary that the human body should experience a blend of radiated and convected heat. This the block type of thermal storage heater provides in excellent proportions. Some authorities consider that at present every installation should be designed to take account of the thermal characteristics of the building to be heated, but for smaller jobs other engineers work to an average of one watt/cu ft, though the range experienced in practice is 0·8 to 1·8 watts/cu ft. As with all forms of heating using a high-grade fuel, the thermal storage heater is only suitable where there is a reasonable standard of thermal insulation, and it shows to best advantage in substantially constructed premises.

Heaters are usually arranged for thermostatic control in addition to time-switch operation, as this enables advantage to be taken of any rise in outside temperature during the night. A typical installation uses room thermostats shielded from direct radiation and working on the room temperature. These may be set to a temperature of 60-65° F, according to the conditions that are found most comfortable. They are, of course, only operative during the night-time and their real effect is to determine what shall be the air temperature at the end of the heating period.

Performance of thermal storage heaters may be judged from two criteria: the comfort conditions which they produce during the day time, and the total consumption of energy. Taking air temperature as an indication of comfort conditions, it has been found that in the difficult situation offered by a large showroom, with its constantly opening doors, the air temperature has been maintained between 61° and 63° F during the period from 9 a.m. to 7 p.m. when the recommended density of loading was installed. The minimum outside air temperature recorded that night was 33° F. A record is shown in Fig. 4.

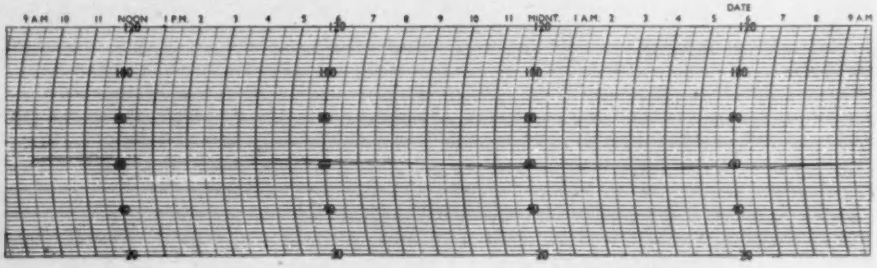
Temperature Variations

It is found from the study of records in several installations, that the temperature in heated rooms falls to its minimum level in the early hours of the morning (about 5 a.m.). The effects of room occupancy and of the general ambient warming-up have the effect that the peak of temperature is attained at perhaps the best time—in the mid-afternoon. Unlike some earlier designs of thermal storage heater, those now available have no need of a mid-day boosting charge to maintain good temperature conditions.

The worst faults of heating systems are found to be avoided, in particular that of "stratification" of the warm air. When thermal storage heaters are installed there is little difference between the air temperature at floor and ceiling.

So far as consumption is concerned,

Fig. 4. This temperature record is reproduced to show the constancy of temperature maintained by thermal storage heaters in a showroom



experience so far available suggests 1,000-1,800 kWh per year for each kilowatt of heater capacity installed, when the thermostats control the temperature to 60-65° F.

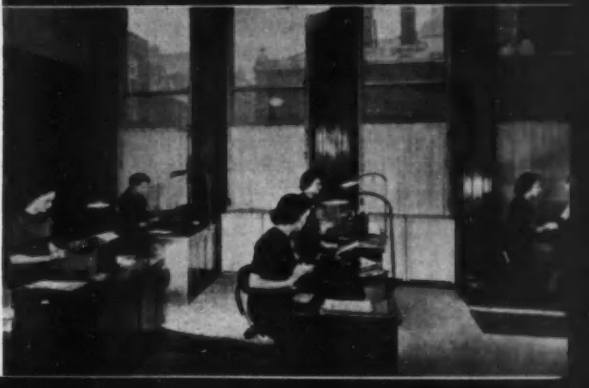
Tariffs

It is obvious that the attractive night load which heaters of this type present qualifies them for favourable tariff treatment. This is most marked when they are in use in premises where a commercial tariff applies. An example is given by the London Electricity Board, which will accept this type of heating load on some parts of its circuit where other additional demands cannot be countenanced. The practice here is for the supply to the heaters to be controlled by a time-switch, which restricts operation to the hours between 7 p.m. and 7 a.m. (During this period, of course, a thermostat is in control.)

Where the consumer is charged on an all-in, two-part tariff, thermal storage heaters are not reckoned in for the fixed charge component, and thus pay only the running cost of 1d./unit. For large installations, special arrangements are made which put the heaters on a "coal-cost adjustment" running charge.

In the Eastern Electricity Board area, it is not part of the present policy to incorporate a time-switch controlling the input of energy to the heaters as part of the tariff. A block tariff is usual, and this provides for a special low night rate for consumers with a demand of 50 kVA or less. Two meters are fitted, only one of which operates during the hours 9 a.m. to 7 p.m., when the special low night rate is available. Thus it is left to the consumer to make his own arrangements for controlling the input of energy to the heaters, so deriving maximum benefit from the special night rate.

As with the London E.B., the larger consumers are supplied on a maximum demand tariff, and where the demand of the night-heating load is less than the normal day-time maximum demand, the consumer obtains his space-heating without any increase in the demand charge; that is, for the running charge only. If the consumers' maximum demand does in fact occur during the



Typical applications of storage heaters

Fig. 5. London Electricity Board service centre window featuring the electric thermal storage heater

night, then special arrangements can be made for the excess proportion of the m.d. charge.

Control Gear and Installation

Control gear for a typical installation consists of a main switch and one or more time switches and thermostats. In large installations it may be necessary to arrange for the time-switches to control the operating coil of a contactor, which will in turn make the heater circuits. From the nature of the tariffs described above, it will be realised that the time-switch in L.E.B. installations is under the control of the Board, while in the E.E.B. area the consumer can select what settings he likes.

Heaters are positioned along walls in much the same way as is normal for the "radiators" of a central heating system. The relatively high weight of individual units (380 or 480 lb on a 2 sq ft base) makes it necessary to exercise some care in their placing, a position near the end of joists being preferred. However, in a building which is in a good state of repair, little difficulty should be experienced in this respect.

Heaters are free-standing, and they are conveniently supplied by short lengths of flexible cable from adjacent 13 amp socket-outlets. They do not, of course, qualify for the relaxations in the I.E.E. Regulations which apply to appliances having a mutual diversity factor.

Thermostatic control can conveniently be applied to heaters in pairs. The thermostat elements are mounted on the wall at a height of 3 ft or so near to, but not directly over, the heaters. They are shielded from any direct radiation, and are initially set to one degree Fahrenheit above the desired room temperature. This setting may require some attention during the early life of the installation in order to obtain the best results.

In large installations there is some advantage in leaving a few of the heaters uncontrolled by thermostats. These will always have a relatively high surface temperature and the increased radiant component of heat output that results is of advantage in maintaining comfort conditions. The thermostatic control on the remaining heaters will ensure that this arrangement normally makes no difference to the total energy consumption.

In the end months of the heating season, the control exercised by the thermostats may be overridden by the time switch if this is under the control of the consumer. In April, say, it will switch on the installation from 2 a.m. to 7 a.m. only, as compared with 10 p.m. to 7 a.m. in January. Another possibility, applicable to to a large installation, is to have three thermostats mounted outside the heated building, and connected in parallel, with time-switches of different settings (Fig. 3). With this arrangement, the full charge is given to the heaters only in cold weather. Where heated premises are used on five days a week only, a programme or selective type of time-switch may be fitted. The building is then allowed to cool down on Friday night, and a full charge given on Saturday and Sunday nights. A worthwhile saving of energy can result from this arrangement.

The heaters are essentially safe in operation, requiring only the usual earthing arrangements. Their high thermal capacity limits the rate at which the surface temperature can rise, even if the control gear should fail. From the aspect of shock risk, they have the great advantage of being switched off while the room they heat is occupied.

The Future

There can be little doubt that, with an energetic selling campaign, thermal storage heating can be built up into a sizeable night load of great value to the supply industry. It has to be realised that this is no new and untried experiment; estimates suggest that the Irish Supply Board's system feeds 20 MW of storage

heaters every night, and the experience obtained in building this demand has been considered in planning installations in this country. (It is of interest to note that for the Eastern Board alone, a comparable saturation would mean a 100 MW night load, supplied with no additional capital expenditure for generation, transmission or distribution plant and equipment.)

This impetus to sell the heaters is increased by last week's Customs and Excise decision that they are to be reckoned as non-domestic, and freed from the heavy purchase tax burden which they have previously borne. At their present costs of £16 (G.E.C.) and £12 0s. 8d. (Aberdare) for 1½ kW heaters, they are undoubtably an attractive proposition compared with other methods of continuous heating, especially water-radiator central heating.

Because the heaters are safe, neat, and unobtrusive, their range of possible applications is great. Offices of all kinds are an obvious possibility, and the advantage of having the workplace warm first thing in the morning is an important consideration. Shops and the waiting and reception rooms of professional businesses can also benefit from the heater's many qualities. Finally can come the larger rooms of corporate organisations such as town halls and even (as in London) embassies, and at the other extreme of elegance, small factories. An important possibility for development is provided in the "smokeless zones" being established in some of our cities. For these the thermal storage heater provides the near-perfect appliance.

The advantages which the heater offers to consumer, to supply industry and—just because it is clean and silent electric heating—to the general public, cannot be gainsaid. Enthusiastic selling can and should turn these advantages into a connected load.

THERMAL STORAGE HEATERS

TWO principal types of thermal storage heater are at present in operation in this country, manufactured by the Aberdare Electric Co. Ltd. (British Office: 36 Victoria Street, London, S.W.1) and the General Electric Co. Ltd. (Magnet House, Kingsway, W.C.2).

Leading dimensions and other details of the heaters are given in the table at the bottom of this page. The "Thermodare" (Aberdare Electric) model uses a refractory material of relatively high specific gravity, and specific heat as its storage medium. Heating elements are threaded through ducts in this storage block, and then the whole assembly is surrounded by a heat insulating material before being placed in a sheet steel cover. Two standard finishes are available: cream or bronze.

An installation feature of some convenience with both makes of heater is the provision of a removable panel which enables all terminal connections to be made from the front. This is specially useful since the heater is normally installed with its back to a wall.

It is estimated that on a normal cycle of operations, one-third of the total heat input is dissipated during the night charging period, and the remaining two-thirds during the day time. The peak surface temperature reached is about 160° F.

In the G.E.C. heater the heat storage material is refractory concrete which is conveniently divided into ten 40-lb blocks which are placed in the bronze finished steel case of the heater after it has been positioned and connected. The removable panel at the bottom of the front gives access to the terminals.

Two elements are used in which the resistors are embedded in refractory concrete blocks over which the heat storage blocks are placed to give two vertical piles of five blocks each.

The heat output of the G.E.C. heater expressed as a percentage of total input starting from cold at midnight—7% between 12 p.m. and 4 a.m., 28% between 4 a.m. to 8 a.m. and 56% between 8 a.m. and 6 p.m., that is during normal working hours in commercial premises.

With the exception of the top, no lagging is required; for the blocks are ingeniously shaped to render this unnecessary.

AVAILABLE ELECTRIC THERMAL STORAGE HEATERS

Make	Model	Loading	Max. Normal Surface Temp.	Approx. Weight lb.	Dimensions in.	List Price
Aberdare	C	1500	160°F	380	21 × 11 × 30	£12.0.8
Aberdare	C	1000	—	274	21 × 11 × 22	£11.17.7
G.E.C.	H0.6300	1500	220°F	480	25 × 11 × 29	£16.0.0
G.E.C.	H0.6300	1250	190°F	480	25 × 11 × 29	£16.0.0

Our readers' views . . .

The Fraud of Solid Fuel

IN a letter in your issue of February 19, Mr. Bellingham concludes by stating that "what makes solid fuel especially popular for continuous domestic heating is its low cost in comparison with other fuels." In the same issue Mr. Barfield, another protagonist for solid fuel, gives his figures for the consumption of an "improved" solid fuel fire—27 lb. of coal during 24 hours.

The cost of 27 lb. of coal at 6s. a cwt. is 1s. 5d. This sum of money will buy 17 units of electricity at 1d. a unit and with this, or less, Mr. Barfield could have a nice warm room at any time of the day and the additional satisfaction that he has avoided burning 10 lb. of the nation's valuable reserves of solid fuel. He need be no longer prepared to put up with the soot and dust. Mr. Bellingham may well pray to be saved from his friends!

ROWLANDS CASTLE
HAMPSHIRE — *E. A. Logan*

◆ ◆ ◆

THE article in your issue of February 12 contained much needed criticisms of the extravagant claims made for modern solid-fuel appliances, and in your issue of February 19 you publish replies from Mr. Barfield and Mr. Bellingham.

The former is well satisfied with his improved fire; he presumably does not object to handling 27 lb of coal a day and is prepared to put up with soot and dust. But some householders find it a hardship to handle coal and clear up dust, and others though prepared to put up with their own dirt are disturbed by pollution of the atmosphere from their neighbours' stoves.

I notice that in Leicester many users of "improved" stoves are not so content as Mr. Barfield; they use as much electricity for heating at peak times as do the users of the old-fashioned open fire.

It does appear to me that the high thermal efficiencies claimed for "improved" fires are of academic interest only and that as suggested in your article "improved" fires often consume more fuel than do ordinary fires.

The Simon Committee's recommendation was "that main winter space and water heater load should be taken by solid fuel," but the plain fact is that the modern improved solid-fuel appliances do not carry the main heating load but have to be supported by electric warmth. The explanation is simple. The Government allowance of fuel is insufficient to meet the wasteful practice of continuous heating which modern stoves encourage and for which a high test-bed thermal efficiency is no remedy. The heavy fuel consumption required for comfortable warmth in modern houses will be reduced only when we learn to build our houses with substantial heat insulation and better methods for reducing losses by air infiltration.

I can heartily agree with the last remark of Mr. Bellingham, "The householder may not know anything about calorific value or percentage efficiencies, but he does know what a fuel bill is when he pays it," and believe that this is why more and more people are finding that electric warmth is within their means and well worth paying for.

D. H. Parry

THURNBY, LEICESTERSHIRE

B.S.I. Progress

YOUR note last week on the new British Standard for Fireguards, B.S.1945:1953, suggests that the B.S.I. will any day now publish B.S.1953:1953. Such a notable conjunction will, it is to be hoped, be marked by a worthy subject, for it certainly underlines the rapid progress which the Institution has made. It is only some twelve years since what may be regarded as the half-way mark, B.S.970:1941, was promulgated.

"Numerologist"

LONDON, S.W.19

INTERFERENCE SUPPRESSION

TECHNIQUES of radio interference suppression as applied to domestic electrical apparatus of all types are described in a new Code of Practice, which has been issued in draft form by the joint B.S.I./I.E.E. committee responsible for its preparation. The committee is anxious to secure as much comment as possible before the code is finalised. Copies of the draft are obtainable from the B.S.I., 24 Victoria Street, London S.W.1, under the reference CO(ELE) 6125, price 2s.

Circuits for Fluorescents

DESIGN AND OPERATING PROBLEMS ARE REVIEWED IN RECENT I.E.E. PAPER

FLUORESCENT discharge tube circuits and operating problems are discussed in a paper presented to the I.E.E Utilisation Section by J. CATES, B.SC., F.INST.P. (General Electric Co.). The paper is one of the "integrating" series, and it is possible in the space available to summarise only a few of the many topics which are dealt with at length in the original.

Discharge tubes of the type discussed are filled with a mixture of argon and mercury vapour, the former at a pressure of a few mm of mercury and the latter (in normal conditions —there is a temperature variation) at a pressure of 0·01 mm mercury. Usually these tubes have coated tungsten spiral elements and, since the discharge has a negative characteristic, some form of series ballast has to be employed. The voltage across the tube during normal operation (the tube voltage) is usually of the order 60% of the supply voltage with a choke ballast, or 60% of the open-circuit secondary voltage when a stray-field transformer is employed. The circuit as a whole has a power-factor of approximately 0·5, and a correction capacitor is necessary.

Considerations of Economy

From economy aspects, the tube voltage of the mains-voltage type of tube should be as high as possible, and tube stability and starting voltage considerations are the principal limiting factors. In switch-start circuits, with the surge applied after pre-heating of the elements, this latter consideration is not so important.

As an example of these considerations applied to ballast economy, for a 5 ft 80 W tube operating on normal voltages, an increase of 1% in tube voltage will reduce the required volt-amp rating of the choke by about 1½%. Higher tube voltage has the additional advantage of improving the uncorrected power factor. The limiting factor here, as with the 4 ft 40 W lamp, is that the tube voltage immediately after starting is about 125-130 V, compared with its normal 110 V. On a 200 V circuit, this gives approximately the maximum ratio (0·6) which can be used in an ordinary choke-ballasted circuit. In an instant-start circuit, safety considerations make the use of a higher tube voltage undesirable.

Adequate stability, with a higher ratio of tube voltage to supply voltage, is possible if a capacitative type of ballast is used, but at ordinary supply frequencies a choke in series with the capacitor is also needed, and there is no economic advantage. A capacitor in parallel with the choke can increase stability, but the current waveform is usually worsened, and there is increased stroboscopic flicker.

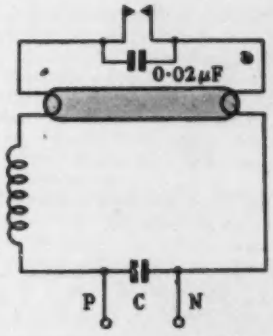


Fig. 1. Switch-start inductive circuit diagram

With a given type of circuit and tube the ballast economy is mainly dependent on temperature, iron flux density, shape and quietness in operation. Temperature is relevant because of the risk of a sticking starter switch, it being cheaper to rate the choke to withstand this condition, rather than fit special protective devices. Excessive flux density increases variation of tube power with supply voltage, while the cross-section of the choke is limited by the size of fitting, although a cubic design usually offers advantages in the utilisation of materials.

Instant Starting

Two principal methods of securing instant starting of fluorescent lamps are available; first, the preheat method, used in this country, which uses a special filament-heating transformer in conjunction with an earthing strip placed near to the tube. The supply voltage is sufficient to initiate the discharge. Secondly, there is the cold start method (used more commonly in the United States) in which a

high enough voltage is applied to pull electrons from the cold electrodes. Typical voltages required by the two methods for a 4 ft 40 W tube are 200 and 450 V for the pre-heat and cold-start respectively.

If an earth strip is used, its effectiveness depends on the surface area it presents to the tube, and on its distance from it. A strip 1 mm wide is very effective when it is in direct contact with the glass envelope along its entire length: at $\frac{1}{2}$ in. away the strip would have to be $\frac{1}{2}$ in.

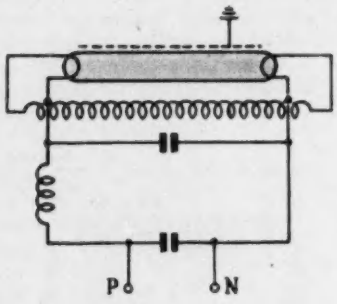


Fig. 2. Pre-heat instant-start compensated inductive circuit

wide to be effective, and would even then be less satisfactory. Nevertheless, when a metallic reflector is available in the lamp fitting, close to the tube, it may prove satisfactory for the purpose.

Starting Strip Connection

Should direct earthing not be practicable, the strip may be connected to the neutral through a high impedance (say 0·005 μF) capacitor. Alternatively, insulated starting strip can be used, consisting of several parallel wires laid along the tube and connected directly to the neutral. In this latter case, effectiveness can be increased by providing an additional auto-connected winding on the filament transformer which will step down the strip voltage to below neutral voltage with reference to the tube electrode phase supply. This arrangement is particularly useful for supply voltages of about 200 V.

Starting voltage is found to be dependent on ambient temperature and humidity. Constant between 15 and 30° C, it falls slowly to 3° C and then rapidly below this temperature. The voltage is independent of humidity below 50% r.h., but at r.h. values of 70 to 80% and especially at higher ambient temperatures, it tends to be substantially increased. No satisfactory explanation of this behaviour has been put forward, but it is likely that the increased surface conductivity of the glass results in the conducting layer being distributed so as to cause a reduced potential gradient near the electrodes. A thin layer of water-repellent silicone varnish can improve matters.

Flicker and Harmonics

With d.c. supplies there is effectively no stroboscopic flicker from a lamp, although a high frequency ripple is in fact present in the current and light output. When only a very small stroboscopic flicker can be tolerated with an a.c. supply, six-phase rectification, with a choke and capacitor for smoothing can be a great help. The well-known twin-tube arrangement can help to reduce flicker on a single phase supply, with still further reduction from a three-tube arrangement in which two tubes are operated in a twin-tube circuit and the third with a resistive ballast.

Harmonics inherent in the discharge tube current wave-form can give trouble, especially where a private supply is concerned and is feeding on a three-phase system. The harmonics concerned are the odd multiples of three, and in a balanced arrangement these are additive in the neutral instead of cancelling out. The harmonics are to some extent dependent on the ballast, and this should be designed for a conservative core flux-density. Some improvement may be obtained on a private supply by introducing an interconnected-star reactor between lines, and bringing the neutral to the centre point of this.

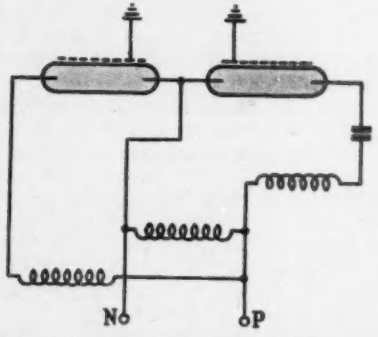


Fig. 3. Instant-start cold-start circuit using stray field auto-transformers

Table 1 shows how the neutral current in a balanced three-phase supply is increased by the pressence of the power factor capacitor across

the fluorescent lamp. It emphasises the undesirability of aiming at a very high overall power factor.

TABLE 1. ONE 80-WATT INDUCTIVE INSTANT-START UNIT IN EACH PHASE OF BALANCED 3-PHASE 240-VOLT 50-C/S PUBLIC SUPPLY

Capacitance	Overall power factor	Line current	Neutral current	Current ratio
μF		amp	amp	%
0	0·46	0·915	0·175	19·1
8	0·81	0·54	0·252	46·6
10	0·905	0·48	0·276	57·5
12·5	0·96	0·45	0·312	69·5

In lamp circuits employing either an inductive or capacitive balance, a high-voltage surge may be set up across the switch contacts at break, and this may give rise to some arcing. This is less serious when a shunt capacitor is used with an inductive ballast. Where the shunt capacitor is absent, as with a capacitive ballast or with the twin lamp arrangement, there is still little likelihood of any flash-over trouble in switches arising from this cause. As a precaution, however, it is recommended that switches with non-metallic covers should be used for fluorescent lamp circuits. Satisfactory switch life is achieved from the contact wear viewpoint if the switch concerned is used only up to 75% of its full rated capacity.

DISCUSSION

MR. N. SIZER (Ministry of Works) commented on the limitations imposed by the need in some domestic and similar applications to use the fitting as the container for the control gear. It was probably necessary to consider ballasts, switches, etc., as consumable until they could be designed with a long life. It seemed excessive to pack so much equipment out of sight, and too often, the diagram of the connection of these accessories was not available when it was required. Instant start has much to be said for it at present. He considered the possibility of including a cut-out in fittings which would operate on the occurrence of a fault, and so prevent repeated flashing of the tube, which could be a definite nuisance.

MR. H. S. PETCH (L.E.B.) considered fluorescent lamps from the point of view of the supply engineer concerned with the harmonic voltages they developed. In the paper there was perhaps overemphasis on the current in the neutral wire: this was, in fact, absorbed in a distribution circuit at the first delta winding in a transformer, as it consisted mainly of third harmonics. Yet it did indeed reduce the rating of transformers in some cases. Possibly, however, the voltage effect was of most importance. As the frequency of harmonics increased, so did the voltage associated with them. Because of this, large power factor capacitors, which offered a comparitively low impedance path, could become dangerously overheated.

French supply authorities had found it necessary to limit the amount of harmonics which could be fed into the system. In his view, similar action should be at least considered in this country. Choke-ballasted fluorescent lamps in general fell within the French standards.

MR. S. ANDERSON (G.E.C.) made the point that it was possible to design control gear for electric lamps which offered apparent advantages over more expensive types, but which in the long run was far less satisfactory. With regard to power factor, he pointed out that it would be possible to arrange lamp circuits for a p.f. of 0·8 leading if this were acceptable to the supply authorities without penalty. He commented on the difficult task imposed on British designers by the wide range of supply voltages for which they had to provide.

MR. W. A. STICKLEY (Ekco-Ensign) considered that the quick start circuit was the only worthwhile arrangement for normal jobs because with it only the lamp itself had to be regarded as expendable. There were many hundreds of special circuits which had been designed for difficult circumstances.

Mr. G. LYNAS (Vauxhall Motors) endorsed the remarks of Mr. Petch about harmonics. For a large installation he considered that the answer was to run two lamps in series across the phases, though this could cause certain difficulties. In particular, there was trouble about switching from the safety viewpoint unless three-pole switching were used. For large installations, he felt that the instant-start arrangement was the only one worth considering.

R. B. MILLS (B.T.H.) thought that an outstanding advantage of the instant-start circuit was that it lessened the amount of maintenance required. In connection with the reduction of stroboscopic flicker, he felt that conversion to an h.f. supply would be cheaper than the use of a hexaphase supply

MR. W. R. BLOXIDGE, after discussing sequence-start circuits, passed on to d.c. supplies. He said that he had seen end-blackening occur at the end of three or four hours running, rather than the 24 hours the author mentioned.

MR. H. D. TAYLOR contended that it was no answer to the simplicity problem to devise clever special circuits to meet individual problems. It should be possible to exchange any one fluorescent fitting with another.

MR. D. F. CHAPMAN (Thorn Elec. Ind.) thought that much would be seen in the future of the preheat instant-start circuit with sequence start. These seemed to make possible worthwhile savings in ballast size and cost. The main problems which had prevented their widespread introduction were concerned with lamp starting, stability and wave-form, but it was possible to improve all these characteristics.

Troubles on Gas-Turbo Locos

Operating Experiences on the Western Region

SOME interesting details of the operating experience with the two gas-turbine locomotives running on the Western Region System, were given last week at a meeting of the Institution of Locomotive Engineers. Mr. A. W. J. Dymond, who presented the paper, began by giving a short history of the projects. The first locomotive to operate was built by Brown Boveri, and was a 2,500 b.h.p. machine, carried on two three-axle bogies, four of the six axles being driving axles. The turbine worked at a maximum temperature of 1,100° F with a pressure ratio of 2·4. The main fuel used was a residual petroleum with a viscosity of 950 secs, Redwood No 1, at 100° F and a net calorific value of 17,400 B.Th.U. per lb, but, for starting, gas oil was used. The second locomotive, built by Metropolitan-Vickers Electrical Co. Ltd., had a nominal output of 3,500 h.p., but this had been restricted on the machine as delivered to 3,000. The fuel used was gas oil with a gross calorific value of 19,500 B.Th.U. per lb.

Operating Experience

The Brown Boveri locomotive, No. 18,000, first ran under its own power from Swindon to Badminton and back on February 13, 1950. On March 9, 1950, failure occurred of the first three rows of compressor blading, due to "flutter" caused by the irregular flow of incoming air. New blading was fitted, together with damping rings, and after some preliminary runs the locomotive went into service between Paddington and Plymouth on May 22. Testing was still being carried out and a starting trial on the Hemerdon bank (1 in 42) showed the locomotive incapable of starting with a 350 tons gross trailing load. A successful run was, however, made up the bank with a 400 ton load, and no signs of overheating were detected in the generator or motors. However, on June 13, a binding coil came adrift in No. 2 traction motor, which effectively wrecked the brush-gear and windings. The motor was removed and the locomotive went into operation on three motors. Trouble was also experienced with the heating boiler and several small defects were found and rectified.

During the second year of operation, the only serious stoppage was a disastrous fire which broke out in the heat exchanger, completely wrecking the whole unit. This was thought to be due to accumulation of soot in the interior of the tube nest which was ignited by a short period of high temperature running followed by a lay-by period. The combustion chamber liner had also to be replaced several times. The engine continued on the Paddington-Bristol-Swindon schedule throughout the remainder of its second year of operation and had completed 72,590 miles up to February 2, 1952. In September of that year, however, slight cracking was observed in the first and second rows of blades on the turbine stator, and the engine was sent to the shops for reblading and also the installation of a larger train heating boiler.

Maintenance

Thus there had been three major incidents since the locomotive had been put into service: the compressor blading failure, the traction motor breakdown and the heat exchanger fire. The most persistent trouble, however, had been the failure of the combustion chamber lining. This distortion and wasting had pointed consistently to the difficulty of ensuring efficient combustion of residual fuel over the operating range. It is, however, thought that research work now being carried out by Brown Boveri, the Railway Executive and Shell Petroleum will lead to considerable improvement.

Fuel consumption had remained remarkably constant, dropping from 3·03 gallons/mile initially to 2·81 gallons/mile during the last twelve months. This was the equivalent of a work to fuel ratio of 6·7%. Compared with the bench test figures of 16·8% at full output, this might be thought low, but was explained by the fact that the average loading was only 50% of full load, and the gas turbine has inherently a rapidly declining efficiency toward light loads. Idling and light running accounted for far more than their fair share of fuel consumption.

Locomotive 18,100

Operating experience on the Metropolitan-Vickers locomotive had, of course, been less extensive. Initially there was some trouble with hunting in the main control gear and some time was spent in suppressing this. No major

incident intervened before the first passenger train trip on April 4, 1952. One day was, however, lost while the engine was working the Paddington-Bristol run, due to an electrical fault in the battery starting system which prevented the turbine being motored up to speed. By the end of May, 15,500 miles had been run with no serious incident, but in June an oil pipe fracture led to the machine being brought in and the opportunity was taken to carry out several desirable modifications. Early in August, after some further operation on the Bristol run, the locomotive was put to work on the Plymouth run, making the round trip in one day. In September, however, a serious defect in the control circuits caused a small fire, requiring considerable renewal of the wiring and control gear; modifications were also introduced at this time to the lubrication system of the traction motor bearings. Consumption settled down to 2/97 gallons/mile showing that both the locomotives had very similar thermal characteristics.

Experience Encouraging

General experience with these two novel locomotives was on the whole most encouraging, and they had put up some impressive performances. The operating costs, were, however, somewhat disheartening, the difficulty being to obtain the necessary high utilisation factor and to overcome the low efficiencies of part load working. Modern developments in turbine and compressor design and new designs might, however, greatly improve performance figures.

An All-Gas Turbine Tanker

A NEW "utility" 18,000-ton tanker to be built for the Shell Petroleum Company by Cammell Laird, with propulsion machinery by the British Thomson-Houston Co., is to be powered exclusively by gas-turbines with electric intermediate drive.

The propelling machinery itself will consist of two open cycle gas-turbine units driving alternators which are in turn connected to two propulsion motors to drive the single propeller through a double pinion single reduction gearbox.

Steam Starting

Each gas turbine unit has a two-stage compressor with intercooler and has an h.p. and l.p. shaft system. The former comprises a turbine, compressor and a geared auxiliary alternator and exciter, while the l.p. shaft has a turbine, compressor and the propeller alternator. An unusual feature is that the sets are started by 150 h.p. steam turbines which take steam from the boiler system required for oil tank heating. The main propelling motors are of the double-cage induction type and astern driving is introduced by the normal reversing contactor system.

At propeller speeds lying between 100 and 155 r.p.m., the control of ship speed is exercised by variation of the frequency by control of the generator turbine speed. Under 100 r.p.m. control is by means of voltage variation applied to the propeller induction motors, the controls being in the alternator exciter circuits.

All main auxiliary services are provided by the gas turbines, and these include the large cargo-handling electrically-driven pumps. To provide essential ship's services when the gas-turbines are shut down, a diesel-alternator auxiliary plant is to be installed.

The ship will be built to a specification prepared by the owners, and the machinery to a joint specification compiled by B.T.H. and the Shell Research and Development Departments. B.T.H. will design and make the detailed plans of the gas-turbines and a.c. electrical plant and Cammell Laird will prepare the general arrangement plan of the engine room.

The gas-turbine components will be made jointly by B.T.H. and Cammell Laird and testing will be carried out at the latter's Birkenhead works under B.T.H. supervision before installation in the ship, which is expected to be commissioned in 1956.

Cargo Handling

Steam for cargo heating and tank cleaning will be obtained from a small fired boiler in conjunction with waste-heat boilers taking exhaust gas from the heat exchangers of the turbine. The four centrifugal pumps installed for handling the cargo are to be electrically driven from the propulsion alternator at the high voltage, for shipboard use, of 3,000 volts. One of the two stripping pumps has a similar supply.

Measuring Blade Clearances

Principles involved discussed in I.E.E. Paper

ANY attempt to measure a small capacitance at the end of a long lead must, to obtain any reasonable degree of accuracy, involve some means whereby the shunt capacitance of the lead itself is eliminated. An I.E.E. measurements section paper last week, presented by Messrs. I. A. Mossop and F. D. Gill, discussed this problem, which arose when attempts were made to measure blade tip clearances in aircraft turbines. Although improvements in turbine design have now rendered frequent measurements superfluous, the principle involved in the experiments is one which could be applied equally usefully elsewhere.

Other considerations apart, the construction of aircraft turbo-engines precluded the possibility of a direct measurement. Although this consequently reduced the field to indirect methods, other requirements and operating conditions eliminated all but a method utilising the capacitance effect between blade tips and shroud ring.

Lead Capacitance Effects

There remained, however, with this method, the apparently irremovable objection that, even with a low-capacitance cable, the lead capacitance must be many times that to be measured. As both capacitances are in parallel, the overall sensitivity of the measuring head is consequently reduced, and, moreover, any changes in the lead capacitance become indistinguishable from changes registered by the pick-up head. Ideally, a short lead, having a low stable capacitance, would overcome most of the difficulty. In the present application, operating conditions required that the measuring equipment be positioned some distance from the engine. This meant that with 10 ft of lead, having a capacitance of 100 $\mu\mu$Fd, a change in clearance from 0·04 to 0·039 in. amounted to a capacitance change of approximately three parts in 100,000.

The nature of the measurements demanded of the equipment high sensitivity and good overall stability, attributes of the bridge method. Due to capacitance difficulties mentioned above, direct application of a capacitance bridge would not be conducive to accurate results. Alternative methods based on a resonance effect had also been developed to overcome this capacitance problem, but none, of itself, was exactly suitable. It was found, however, that a combination of both techniques would produce satisfactory results.

Combined Techniques

In the apparatus finally evolved, the resonant element included the entire cable from pick-up to bridge including a transformer inserted in it close to the capacitance pick-up. The capacitance loading of the secondary winding consisted of that of the pick-up, the lead to it from the winding and the referred capacitance of the primary lead together with sufficient capacitance to tune the secondary circuit to resonance at the bridge supply frequency of 50 kc/s. Hence the impedance presented by the lead at resonance was purely resistive and could be measured on a straightforward resistance bridge, whilst the lead capacitance had but a small influence on the sensitivity of the pick-up.

In principle the capacitance between blade tips and shroud was measured against a reference capacitance by the unbalance of the bridge. This unbalance voltage was then rectified and indicated on a peak voltage, so that, as the rotor turned, the peak voltmeter provided a measurement of the minimum clearance. The capacitance of blade tips was registered by a pick-up consisting essentially of an insulated rod mounted parallel to and above the turbine blades. A ceramic insulator was used, silvered on its inner and outer faces to short-circuit unpredictable air capacitances formed between ceramic and metal.

Phase Sensitivity

The bridge, although of the resistance type, was essentially phase-sensitive in that an increase of capacitance from the balanced condition produces a voltage 180° out of phase with that produced by a corresponding decrease To obviate the need for a phase-sensitive bridge, the apparatus included a gap-balance detector which ensured that the bridge was balanced at the maximum clearance. In this way any change in capacitance at the pick-up was in one direction only, increasing, and the bridge would be unbalanced in only one direction. A speed compensator was also incorporated to compensate for the fall in meter reading due to increasing rotor speed to obviate an apparent reduction in clearance.

From AN ENGINEER'S NOTEBOOK

I HAVE always found it difficult to resist the temptation to stray into technical fields of which I have the most abysmal ignorance, and the urge is even greater when a feature such as this is on one's conscience. So in writing this month of the "bangs" from aircraft at supersonic speeds, let me confess at once that I have little knowledge of those more complicated wave theories and the like. One thing is clear, however, the popular concept of a "bang" when the plane "hits the sound barrier" is erroneous, since the energy required to be emitted at this instant would be such as to prevent the plane accelerating into the supersonic region. It appears to be generally accepted now that the "bang" is heard whenever the speed of an approaching aircraft relative to the observer, is equal to the speed of sound. Thus at supersonic speeds the sound may be heard in directions incident to the direct line of flight, while changes of course account for those multiple "bangs" which are sometimes heard. The intensity of the "bang" is more complex in assessment and is shown to be at one of its peaks in steady flight at sonic speed. Under such conditions it has a more limited range and can be heard only in the direct line of flight. The actual cause of these "bangs" has presented particular difficulty of explanation, but it has been shown that disturbances of a similar character are to be expected from flight through an inviscid fluid. Exactly where this leads us is, I hope, clearer to the reader than to myself. One thing is certain, however, there is still much to be discovered in connection with this phenomenon arising from man's latest conquest over nature.

* * *

SOME further details have recently been made available of that extraordinary pump which the Americans are using for handling the liquid metal used in heat exchangers associated with atomic piles. This straight-through pump consists of no more than a flat Nichrome tube in a magnetic field with nothing more complicated than a heavy current passed through the liquid metal in the tube to provide the pumping mechanism. The breath-taking simplicity of the concept, however, appears to be matched by the difficulties encountered in practice. As the pump pressure is directly proportional to the current for a given magnetic field, the primary task has been to obtain enough amps at low voltage. The designers appear to be having second thoughts on the transformer-rectifier combination originally used now that they are wanting currents of the order of 20,000 amps at 0·5 V and are turning to our old friend the homopolar generator. The efficiency of 50-60% is said to be better than the rectifier's performance at this low voltage. I should have thought that the high currents to be handled on the brushgear would have frightened anyone away from such a proposition, but the liquid metal in the pump seems to have provided the inspiration to use a sodium-potassium alloy as a liquid brush. If this be the shape of things to come in power stations of the future, I am glad I have long departed from that particular field of engineering activity.

* * *

MOST of us are usually content to attribute failure of a metal part by fatigue to the work hardening under conditions of use, but no one has ever had the illusion that this is the whole of the explanation. Quite a new facet of the problem has now been disclosed by recent work at the Farnborough Royal Aircraft Establishment. Working with an aluminium 4% copper alloy, it was found that under cyclic stressing the grain became covered with fine slip bands and as the stressing continued, thin ribbons of material were actually exuded from these bands. The thickness of the ribbons was below the limit of resolution of the microscope, but on exudation, the ribbons curled over to form coils of about 1 micron in diameter. These coils are usually, but not always, discontinuous along their length, and this is suggestive of varying rates of exudation along the band. It is reported that the ribbons often bear extrusion markings with other unexplained markings at right angles. What effect this phenomenon may have on actual fatigue performance is impossible to say, nor whether a similar effect is observable in less ductile materials. But here we have a starting point for a new line of investigation which may lead to a better understanding of the mechanism of fatigue in metals.—*E.R.G.*

PROBLEMS AND PRACTICE in Engineering

"Emergency Lighting"

A FAULT occurred on a starter of a fluorescent lamp, the starter points were burnt. As the light was required immediately and I hadn't a spare tube, I disconnected the leads from the terminals of the switch side of the starter tube, and inserted a piece of flex long enough to reach by hand. At this end I coupled a bakelite pear push-button type switch. By switching by its usual switch and then pressing the push, this worked quite satisfactorily, until I was able to replace the starter tube.—*G. A. L.*

Audioscope for Trip Testing

I HAVE often found that normal tests on circuit-breaker trip coils cannot always disclose faulty plug and socket or faulty finger contacts in the secondary winding. An instrument I devised some time ago has proved successful in tests of this nature, offering a simple method of checking trip-circuits under three-phase working conditions, particularly direct operated trips with earth leakage protection. It is a simple test, with the advantage that it can be applied at any time after an interruption under actual load conditions without opening the supply. This test is not, however, intended to supersede the usual single-phase injection or direct current tests to verify calibration and circuit-breaker mechanical operation.

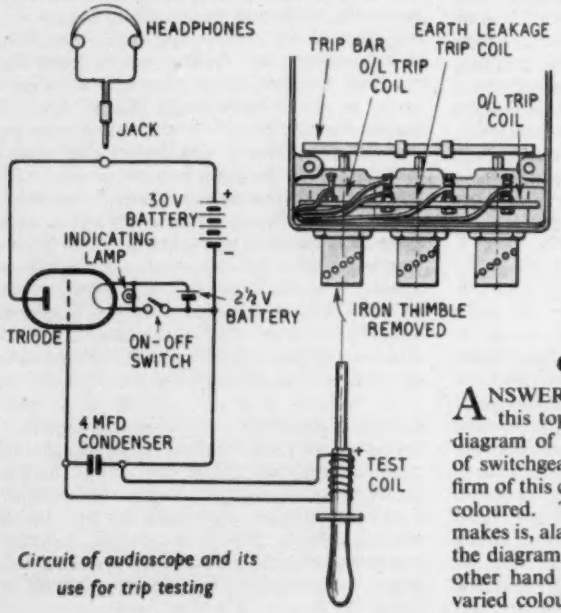
The instrument consists of a one-valve amplifier, a pair of headphones and a small coil. The coil or suitable coil and tubular extension is inserted into the field of each of the three tripping coils after removing the iron thimble or solenoid which is usually provided for operating the tripping bar. Spill currents diverted into the leakage coil circuit is an important feature in its operation. An unloaded power transformer switched in usually gives sufficient signal strength and a tuning condenser across the test coil improves the tone quality.

The instrument has been on trial to detect successfully the following conditions:

(1) Blown fuses and bad contact at fuse holders and elsewhere.
(2) Open circuit in any of the three current transformer secondary windings or over-current trip coils.
(3) Dissimilar current transformer ratios.
(4) Current transformer having reversed polarity.
(5) Incorrect connections for earth leakage.

This information is obtained without interrupting the supply. Normal routine tests are not superseded but they might well be halved, resulting in some saving in maintenance costs.

—*Geo. W. O. Roscoe.*



Circuit of audioscope and its use for trip testing

Colour in Control

ANSWERING the comments of R.A. on this topic. I have before me as I write a diagram of connections for a particular piece of switchgear manufactured by a well-known firm of this country, whose control wiring is all coloured. The pretty picture the diagram makes is, alas, but a figment of imagination for the diagram is coldly black and white. On the other hand the actual control panel with its varied colours is indeed a picture of neatness

and clearness. How this piece of gear could be designed, manufactured and sold without the fullest consideration of "the economics of manufacturers' costs and competition," to quote R.A. must remain another "closed book" to the poor maintenance electrician. Every change in accepted practice must first overcome prejudice, and "the economics of manufacturing costs".

As in my small illustration of the bunching of conductors in diagrams I omitted the various colours, it would be possible to add to each branch entering or leaving the bunch a letter, *viz.*, G, R, W, B, Blk. A colour code on the diagram will read G-Green, R-Red, W-White, B-Blue, Blk-Black. Not a pretty picture, but one which we must hope R.A.'s manufacturers' wiremen would "ensure that every wire would correspond" with the diagram.—*T. H. Snelson.*

IN his attack on the two contributors R.A. has shown a lack of knowledge of the subject. The points brought up were concerned with machine tools, so for his information it would be as well to enlighten him further on this subject.

The requirements are that motors driving these machines are or have, taken the place of fast and loose pulleys, clutches, a certain amount of gearing, and brakes and, as there are more motors than one on a machine, the starters are mounted in a multi-motor control panel. But the wiring does not end here, as these starters are controlled from a variety of switching arrangements and operated by hand, sliding or rotary motions of the machine, and/or sometimes electronic control. There is wiring to solenoid operated valves on the electro-hydraulic machines and also to magnetic chucks and face plates.

For maintaining these machines with a large variety of complicated control circuits, one must have every facility possible and equipment that has the common faults reduced to a minimum. A drawing with wiring and schematic diagrams to hand with the machine is far better than trying this or that, and trusting to luck in putting a finger on the fault, before returning reluctantly to a central workshop and searching through files.

The large variety of controls prevents a man being just a specialist. He may be following a drawing to pick up a clue to the operation and when meeting a mass of lines he inevitably picks up the wrong one at the other end. Mr. Snelson pointed out a system that prevents this. As for the main topic—colour—there is no necessity for each wire to have its own colour. What is required are groups of colour. The wiring for a motor to be one colour, mag. valves another, and similar with hand switches, auto-switches and so on.

As for economics of starter manufacture, the maintenance man could show two outstanding American types which have eliminated all faults and, it appears, could be operated eternally. These must be cheaper to produce than any English counterpart.—*J. Pendlebury.*

[This correspondence is now closed—Ed.]

Earthing at Fault

THE following true story shows how a combination of circumstances can cause trouble if everything is assumed correct and facts taken for granted are not checked.

A ½ in. capacity electric hand driller was being used in an outlying part of the factory—a separate building supplied with three-phase and neutral by overhead wiring from the main building. Lacking a proper socket outlet for portable 230 V tools, a bright spark had connected one wire to phase inside a three-phase c.i. switch, and coupled the other to the conduit system of screwed h.g. conduit which ran throughout the building supplying various shops. This apparently was his usual practice, employed many times before with success.

The driller ran well for a while but suddenly failed to function, while heads shot round various doors complaining of shocks on switching on the lights. The next phenomenon to manifest itself was a shower of sparks from an obscure corner which on investigation was found to be caused by a small coil of iron wire, obviously thought to be of future handiness, which was pushed between a ¾ in. conduit switch drop and a 1 in. gas pipe which conveniently ran near it for a short distance.

The whole conduit system was found to be completely unearthed and never had been earthed. The small coil of wire had provided, via the gas pipe, an earth return for the bright spark's driller. This had now failed as the wire had rusted and provided only intermittent contact with the two pipes. This also accounted for the shocks received from the various switch-boxes, as the current flowed from phase through driller motor to conduit and switch-boxes, via unwary one, to damp concrete floor.

These happenings were a little disturbing on first glance, as the conduit system was assumed to be adequately earthed, being run by a supposedly competent contractor during the war.—*G. B. M.*

We wish to correct two errors in "Power Factor Chart," on this page last week. In col. 2, line 7, for "W_2" read "W_1"; and in line 12, "responsible" should be "responsive."

Inventiveness Today

Electrical Ideas at London's Newest Exhibition

OVER one hundred examples of ingenuity and inventiveness are to be seen at the Central Hall, Westminster this week at the first postwar exhibition of modern inventions and new ideas. Under the direction of the Institute of Patentees, Inc., the inventions section ranges from industrial to domestic fields, offering the less imaginative an accident-proof deckchair or a water-operated pump. Electrical exhibits, drawn from both industry and individuals, provide stimulus for engineer and layman alike.

Pride of place was given to a model of Faraday's coil which was used to demonstrate the discovery of electro-magnetic induction. By its side was the control gear of a guided missile first flown in 1917 and designed by Professor A. M. Low. Industry's contribution included a magnetic sorting bridge loaned by the G.E.C. In this equipment magnetic properties of any given test piece are compared against a standard, any differences being displayed on a cathode ray oscilloscope. From the same company were shown exhibits of cold pressure welding, and a layer thickness meter, whilst the electrical and musical industries were displaying r.f. dielectric heating equipment used in "Bakelite" moulding.

Although, in this field, electronics played an important part, of pure electrical interest was the Streader Anchor joint, designed to anchor transmission line cables at terminal towers. The cable end is held in a die-cast aluminium block fixed to the insulator string. A tapered hole runs through the block, through which the cable end is passed. It is fixed in the hole by means of a split tapered tube fitting over the whole cable and a collet over the end of the inner core, this latter being driven down into the tapered core by means of a hydraulic ram.

For domestic purposes was shown a ceiling rose, constructed in three parts from moulded synthetic resin. Its body, which houses the electrical connections, is fixed to a ceiling joist through a hole cut in the ceiling. A connector fixed to the upper end of the flexible cord is locked into the body and kept in place by an outer cover which screws on to the body and also covers the hole completely. Its main feature enables several fittings to be fixed at convenient places in the ceiling and used as required, whilst the remainder are covered by plates.

Heating appliances included an automatic egg boiler, in which a given quantity of water is boiled until completely evaporated, which switches off the supply. Elsewhere, a graphite impregnated heating mat was in use to heat a draining board and so obviate the need for drying dishes. On another stand was demonstrated what was claimed to be a fool-proof burglar alarm and household protection unit. The door is secured by an electrically controlled lock fixed in the door jamb, operated by an electronic unit. A plug, connecting capacitors to tuned circuits to damp a normally continuous oscillation is the 'key' for opening the door. Should any attempt be made to tamper with the equipment, relays operate an alarm system which can be made to dial "999" or give similar warning.

TARIFF CHANGES IN S.E. SCOTLAND

FURTHER tariff changes, to operate from April next, are announced by the South East Scotland Electricity Board. These comprise a new standard commercial tariff (with reductions for off-peak consumption) and variations in the industrial rate applicable in Edinburgh. For the smaller commercial consumers the first block of units will be charged at 4½d. per unit (3½d. in Edinburgh), for a second block the secondary rate will be 1½d. per unit, and all in excess will be at 1d. per unit.

In Edinburgh, Kirkcaldy and Falkirk the assessment of units in each block is as follows. The primary rate applies to 16 units per term for each 100 W of lighting installed and 40 units per term for each kW of other apparatus or each h.p. of motors installed. The secondary rate applies to 32 units per term for each 100 W of lighting and 320 units per term for each kW or h.p. of other apparatus.

For the remainder of the Board's area the primary rate is charged for 12 units and 30 units respectively, and the secondary rate to 24 units and 240 units per term respectively.

For larger consumers a two-part tariff is available under which the consumers' annual maximum demand will be charged at £7 10s. per kW and each unit at 0·65d. plus a fuel adjustment clause. Off-peak and restricted hour supplies will be charged at ¾d. per unit throughout the area. These new tariffs will result in an average increase of 8% on the charges at present in force.

Under the changed industrial tariff applying in Edinburgh, the standing charges per kVA of m.d. are raised to £4 10s. and £4 respectively, and the running charge is raised to 0·45d.

Orders and Output—1952

BABCOCK AND WILCOX, LTD.

BOILERS with an aggregate evaporation of 14 million lb of steam per hour were commissioned by the company's own service department during 1952. In addition a number of installations were erected and commissioned by associated companies. Together, the total output shows that the demand remains at a high level, and similar results were shown in the field of marine boilers, handling plant and cranes, and special vessels for oil refineries and other applications.

Power Station Work

Babcock and Stirling boilers steamed for the B.E.A. totalled 22 and accounted for more than 43% of the total plant installed in a record year. The new boilers were Battersea (1×425 klb/hr), Blackwall Point (1×365 klb/hr), Braehead (2×300 klb/hr), Brighton "B" (2×320 klb/hr), Bromborough (2×300 klb/hr), Clarence Dock (2×350 klb/hr), Keadby (1×550 klb/hr), North Tees (2×360 klb/hr), Rye House (1×350 klb/hr), Staythorpe (3×240 klb/hr), Uskmouth (2×360 klb/hr), and Westwood (2×300 klb/hr).

The most interesting of the contracts placed during the year was that for three of the Castle Donington boilers, which are designed for unit operation with 100 MW turbo-alternators. Outstanding by reason of their capacity (830 klb/hr at 1,600 lb/sq in., 1,060°F) they have a number of unusual design features including twin furnaces and coarse temperature control by burner selection. Other contracts placed included two further 320 klb/hr High Head units for Brighton "B" and three 515 klb/hr units for Meaford "B".

Overseas, three further peat-burning boilers were ordered for the Allenwood station of the Eire E.S.B. These, of 150 klb/hr output are fitted with Style 28 twin stokers. A further 150 klb/hr Stirling tri-drum unit was commissioned at Belfast.

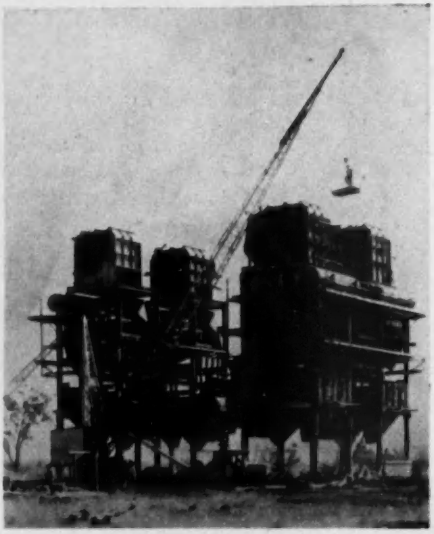
In South Africa, Hex River, with the first spreader stoker installation in the Union, went into operation with four 200 klb/hr boilers;

Above, Braehead No. 6 boiler under construction

and a large contract was placed during the year for six 187·5 klb/hr boilers for the new Kelvin power station of the Johannesburg City Council. A considerable proportion of this boiler plant will be made at the new Vereeniging works of Babcock and Wilcox of Africa (Pty), Ltd. The seventh unit has also been ordered for Taaibos which will have the same size (580 klb/hr) as the six now under construction. Two 260 klb/hr units are on order for Salt River, and in Southern Rhodesia, new ground is being broken by introduction of p.f. firing for two 260 klb/hr units which have been ordered for Salisbury No 3 station.

In Australia, four of the six Cross-type units of 50 klb/hr for Rockhampton were commissioned as well as the fifth boiler of 150 klb/hr for Osborne "B". Orders received include four units for Tennyson power station at Brisbane. These have outputs of 160 klb/hr and are to be fired with "Rotograte" stokers.

At Connaught Bridge in Malaya, the end of the year saw the station about to go on load. Located about 26 miles from Kuala Lumpur, it is one of the largest engineering projects to be undertaken in the Federation, and will have an ultimate capacity of 80 MW. The boilers here are oil-fired. At Singapore, Pasir Pajang has begun steaming and this station will ultimately contain four 25 MW sets and nine 187·5 klb/hr boilers.



Rockhampton (Queensland) boilers being erected

The largest industrial boiler so far projected in Britain was the subject of a contract placed during the year, by Bowater Lloyd Pulp and Paper Mills Ltd., for their mills at Kemsley. This will be a Radiant unit, having a capacity of 450 klb/hr at 1,550 lb/sq in., and 925° F, with reheat. The furnace is designed for "pannier" firing from both sides of the unit, with down shot burners for low-volatile Kent and Northumberland coals.

Other large installations include two Stirling Tri-drum boilers of 330·7 klb/hr for I.C.I. Billingham and two high-head boilers of 265 klb/hr for I.C.I. Wilton, the latter being fitted for pulverised fuel, oil or gas firing.

Abroad large installations have been steamed at Baelen (Belgium), Holland and Peru.

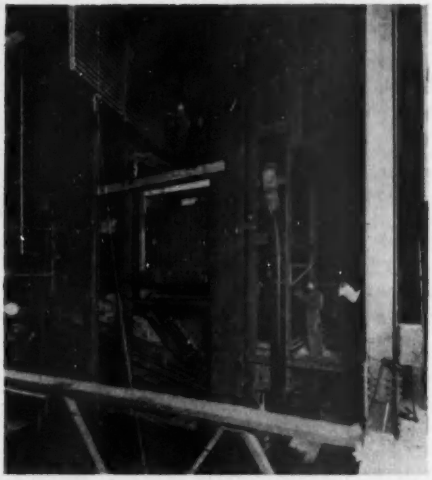
Mechanical Handling Plant

One of the most interesting coal handling plants is that at Uskmouth power station, Newport, Mon., the first part of which began operation during the year. Ultimately this installation will deal with railborne coal at the rate of 600 tons/hr, and is the first plant to use "Taylor" type tandem drive for the two conveyors which are approximately 700 ft long, rising from below ground level to an elevation of some 70 ft. Separate motors are used with hydraulic couplings to each driving pulley, thus avoiding slip between pulleys and belt which so often occurs with the normal geared tandem installation.

Another interesting plant, now in full operation, is that at Westwood (Wigan) which is remarkable for its flexibility since it can handle coal from barges, railway wagons, or lorries, with equal facility.

The "Hydrojet" high pressure sluicing system of ash disposal and "Hydrovac" dust handling equipment are being widely specified, and contracts have been placed for Stella North, Stella South, Castle Donington, Tilbury, Skelton Grange, Ince and Marchwood.

An unusual item of handling plant is the barge loader commissioned during the year in connection with the ash plant at Bromborough power station. This loader handles the ashes from the conveyor into barges, and can travel up and down the wharf to suit the barge. The luffing boom can be adjusted to suit any state of the tide, or the trim of the barge, or can be luffed right up out of the way, leaving the front line of the wharf clear of obstruction. If barges are not available, the ash can be discharged by another conveyor on the opposite side from the boom, to emergency pits, from which it is recovered by grabbing. A unit for similar service has been supplied to Dunston.



No. 3 boiler in course of erection at Westwood

The largest crane commissioned during the year was that for the turbine house at Uskmouth, which has a capacity of 175 tons, and a span of 62 ft. Orders received during the year include overhead travelling cranes of 80, 20 and 12 tons capacity for Kelvin (Johannesburg) power station and two portal-type level luffing jib cranes for Swan, Hunter and Wigham Richardson.

26 FEBRUARY, 1953

Infra-Red and Car Production

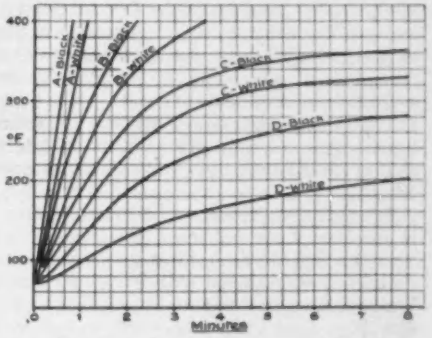
Car entering the drying bay at Vauxhall Motors

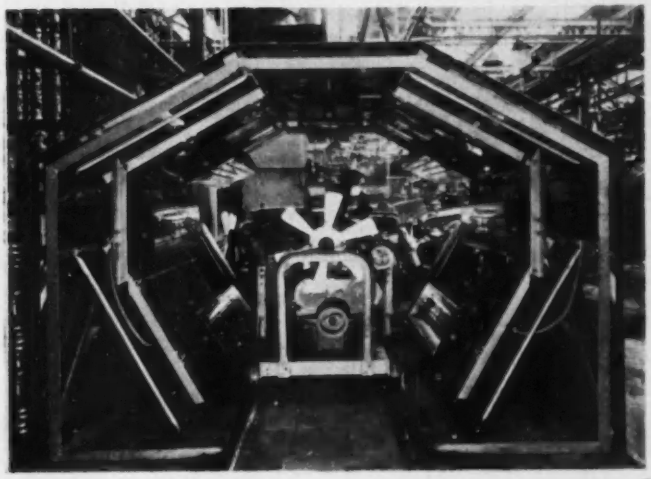
THE introduction of synthetic polymerising paint finishes has made infra-red drying increasingly popular with car manufacturers and it is now being used for a variety of tasks ranging from small components to the finished vehicle. Metrovick infra-red equipment, which uses a heating spiral embedded in magnesium oxide within an alloy tube, has found a wide application in this field.

Two typical large-scale installations are shown in the accompanying photographs. The one at Vauxhall Motors Ltd. is for drying moisture off the car after cleaning and for cellulose paint drying following final spotting and touching up. Drying is completed in four minutes. The other installation, constructed by A.E.C. Ltd., uses nine standard Metrovick 3 ft 4 kW projectors mounted on a simple framework. This oven is used for drying chlorinated-rubber grey air-drying paint and grey synthetic paint on horizontal and vertical engine castings.

An idea of the effect of colour on the temperature rise of painted flat steel panels 0·049 in. thick, is shown in the line drawing.

The curves are: "A" for panels irradiated on both sides by projectors with an output of 10 watts/sq in. of radiating area, at a distance of six inches from the panel; "B" for panels irradiated on one side only; "C" for panels on one side only but with the distance increased to 17 ins; and "D" for panels irradiated at an intensity of 2 watts/sq in.

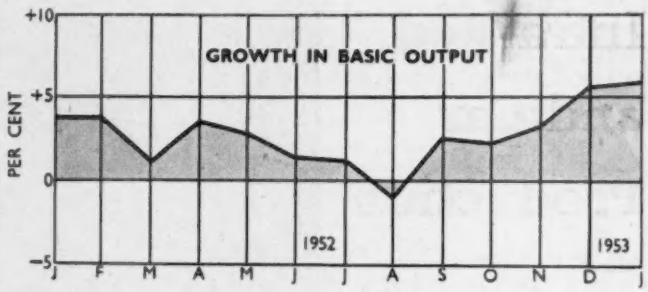




The installation at the A.E.C. works, drying paintwork on engine castings

BASIC LOAD GROWTH

The accompanying curve shows how the energy sold by the B.E.A. in the past 12 months has compared with that of the corresponding month a year earlier. The figures used for plotting are first corrected for the effects of temperature and for the number of working days included in the calendar month. Thus the points marked are an approximate measure of the basic rate of load growth that is being experienced by the B.E.A.



Power Supply in January

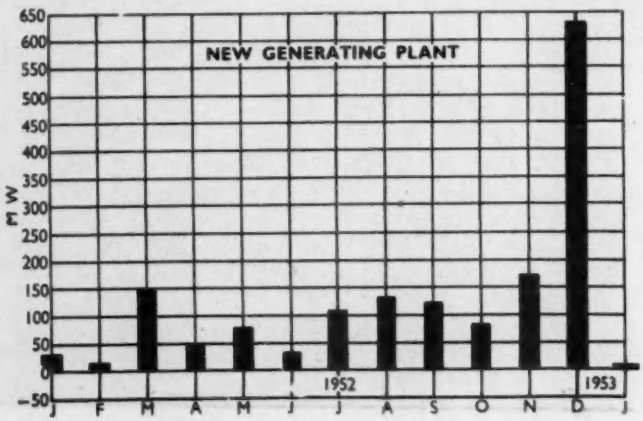
GENERATING capacity was increased in three B.E.A. stations during January, boiler plant being concerned in each case. The first of the stations concerned is Poole in the Southern division, where a sixth 300 klb/hr boiler came on load. This is an International Combustion unit, operating at 900 lb/sq in., 925° F. In the Midlands division there was a new boiler at Nechells B, the seventh to be commissioned there. Once again International Combustion are the manufacturers concerned, the boiler being of 230 klb/hr rating for 650 lb/sq in., 825° F steam conditions.

Babcock and Wilcox are the manufacturers in the last of the boilers in the January list. This is a 300 klb/hr installation at the Bromborough station in the Merseyside and North Wales division, and it operates at 900 lb/sq in., 900° F.

It has been mentioned before in these columns that the phrase "North of Scotland" indicates the N. of S. H.-E. Board and the Lochaber Power Co. From next month, this arrangement will be changed and the output of the Lochaber Power Co. will be excluded from the figures. The totals concerned are about 35 mil-

B.E.A. SALES TO AREA BOARDS IN JANUARY

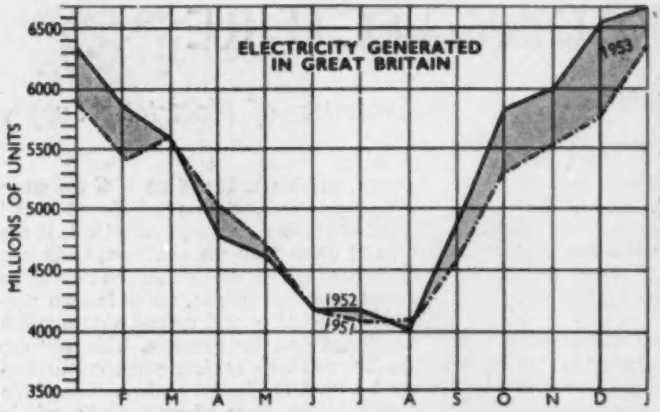
Board	Jan. total in million units	% in. or dec. on Jan. 1952
London	645·4	+8·4
South Eastern ...	357·9	+9·1
Southern	415·0	+10·3
South Western ...	196·7	+9·1
Eastern	575·2	+9·2
East Midlands ...	474·8	+7·3
Midlands	628·7	+3·3
South Wales ...	312·8	+4·9
Merseyside and N.W.	336·9	−3·0
Yorkshire	595·3	+4·2
North Eastern ...	340·6	−1·9
North Western ...	656·5	−1·5
S.E. Scotland ...	127·6	−1·5
S.W. Scotland ...	306·4	−2·2
Direct Sales ...	75·3	+16·2
Grand Total ...	6,045·1	+4·3



GENERATING PLANT

At the end of January, 1953, the installed capacity of the B.E.A. was 17,185 MW, showing an increase of 5 MW during the month. During this same period the North of Scotland H.-E. Board total remained constant at 560 MW. The month's commissioning figures bring the overall increase during the past twelve months to 1,477 MW, or 9.1% of the total at the end of January, 1952.

The total installed capacity used for the purposes of this graph is the total m.c.r. of all the generating sets which are connected on both steam (if appropriate) and electric sides and are suitable for service.



UNITS GENERATED

6,609 million units was the total generated during November in stations under the control of the B.E.A. and the North of Scotland H.-E. Board. The corresponding figure last year was 6,318 million units. The curve includes these totals with those for the Lochaber Power Co.; a note on this change in presentation appears in the text.

Of the total, 6,480 million units was generated in steam stations and 111 million units in hydro-electric.

Energy sent out during the month was 6,233 million units, 94·4% of that generated.

lion units/month and 83 MW of installed plant. The change in the "Electricity Board Sales" and "New Generation Plant" diagrams is made this month.

Demand

As shown by the diagrams on these pages, sales were well up in most parts of the country in comparison with January 1952, and in fact the increase is effectively greater than the 4·4% shown, because although the average temperature for the two Januarys was much the same, last month had fewer working days, including as it did five week-ends. It is of interest to note that, in comparison with 1952, the weather was warmer in the north of the country but colder in the south which accounts for some of the differences indicated in the "Electricity Board Sales" diagram.

This same difference has had its effect on the increase in sales of industrial and non-industrial area boards. Those boards in which industrial consumers take over half of total sales showed an increase of 1·6% compared with 1952, while the non-industrial boards had a corresponding figure of 8·5%. There are eight boards in the first category and six in the second.

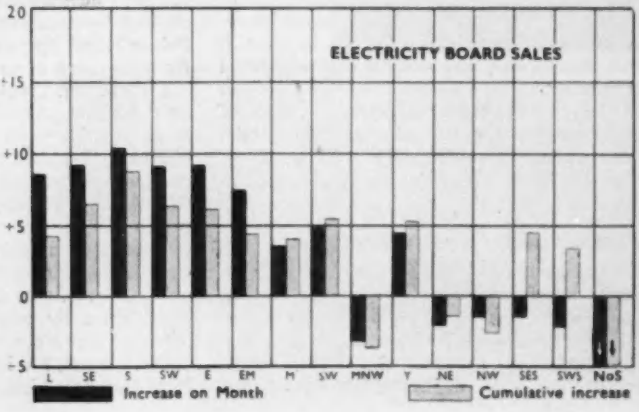
Special Features

Included in the special features that are affecting the sales of individual area boards relative to last year, three factors may be noted. In the Southern E.B. the demand of the Farley oil refinery is still having an effect, although it came into operation in the summer of 1951. South Wales figures reflect the increasing demands of the new steel works at Margam and Trostre although another large consumer has reduced consumption. In Yorkshire, the happier position of the textile industry is showing itself.

JANUARY SALES

Progress in the sales of energy by the British Electricity area boards and by the North of Scotland H.-E. Board are represented in the accompanying diagram. The two columns for each entry indicate, respectively, the bulk supply of electricity (or the total generation, for the North of Scotland) taken in January, 1953, as a percentage increase on the corresponding 1952 figure; and the same comparison for the cumulative totals based on the financial year.

It should be noted that the B.E.A. financial year runs from April 1, while that of the North of Scotland has been taken to correspond with the calendar year.



THE FARADAY LECTURE

Evolution of Electricity Supply

A LARGE and enthusiastic audience, comprising all ages, gathered at the Central Hall last Wednesday to hear Mr. Cooper, Controller of the North Western Division of the B.E.A. deliver the Faraday Lecture for 1952-53, and to judge from the applause, it was not disappointed.

Mr. Cooper introduced his subject—"The Evolution of Electricity Supply" by showing an animated diagram which comprised a power station (represented by a small steam engine driving a generator) and a ring main system feeding two towns. With the aid of a frequency meter, a load meter and a time comparison meter, he showed in a remarkably clear and simple manner the effect of overloading of the system, and the necessity for load-shedding. He pointed out, however, that load shedding was not so frequent at the present time. He then explained with the aid of slides the operational system of the Grid and the relationship between Central and Regional control. A short length of film was used to illustrate the operation of Central control, but as Mr. Cooper pointed out in an amusing commentary, the individual reactions of the load dispatchers and controllers shown in the film were not exactly those of the actual engineers on the job.

As information was required at Central control giving the loading state of lines all over the country, devices had been developed in the telecommunications field which would permit several simultaneous but independent communication channels to exist on one pair of lines. This cut down enormously the communication network which would be required if one channel only was used for each individual transmission. Here a demonstration was given of transmitting three independent sets of switching impulses, one meter indication and a voice channel simultaneously over a pair of overhead lines from one side of the stage to the other.

Fundamental Considerations

The last section of the lecture dealt with the fundamental natural cycle whereby heat and light energy from the sun was stored up and had been made available for the use of man. The fundamental phenomenon was, as Mr. Cooper pointed out, that of photosynthesis. By this process, which was bound up with the green colouring matter, chlorophyll, found in all leaves and vegetation, carbon dioxide from the air, and water from the soil, were, under the influence of light, caused to combine to form the complex sugar molecules, which in turn provided the cellulose and carbo-hydrates which constituted the plant structure. This sequence was illustrated by an interesting colour film lent by the U.S. Embassy which showed the process taking place diagramatically within the leaf structure. From the plant life of past ages had come the coal and oil on which modern civilisation depended, and the burning of this coal and oil in turn provided the carbon dioxide and to a certain extent the water which was required by plant life. Compensating this was the oxygen given off by the plants without which human and animal life could not exist, together with the necessary food.

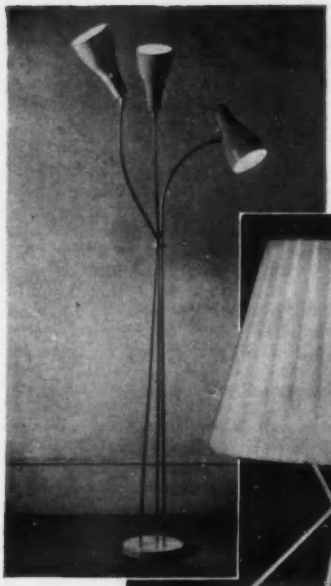
The sun's energy was released when fuel was burnt, in the form of heat, and this heat was used to raise steam to drive the generators at power stations. Through the medium of the heat engine, or the electric motor, the heat could be converted into work, which usually resulted in the production of more low grade heat. To illustrate the conversion of heat into work, Mr. Cooper had a model of the famous turbine devised, traditionally, by Hero of Alexandria, some 250 years B.C., which when heat was applied spun round merrily. That, explained Mr. Cooper, was a true reaction turbine. To illustrate an impulse machine he showed a working model consisting of a small Pelton wheel operated by the steam emitted from the spout of an electric kettle.

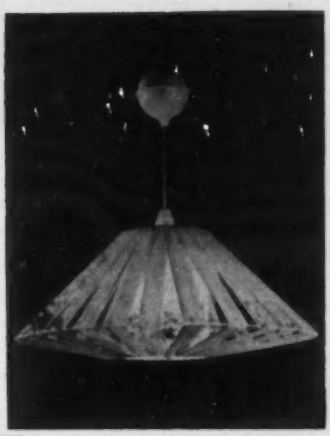
Finally, Mr. Cooper had some words to say on the future. Atomic power would probably come in a few years time, and would provide electricity at a somewhat higher price than coal plant. Another interesting research project was the fuel cell where electricity could be produced directly from the raw materials. He did not, however, think that any people present were in danger of losing their jobs due to fuel-cell power stations. He concluded by showing Faraday's early experiments using a coil of wire and a modern permanent magnet.

Col. Leeson, President of the I.E.E., thanked Mr. Cooper for his most interesting lecture.

Domestic Fittings in the CONTEMPORARY STYLE

TO the simplicity characteristic of contemporary design is added, in a new range of domestic lighting fittings introduced by Mr. Herbert Hiscock, 55 Old Church Street, Chelsea, S.W.3, cheapness and, in more than a few cases, a robustness essential where children are likely to be found. One example showing these characteristics is seen on the immediate left. Its framework is of steel rods, which provide a springing effect should the fitting be knocked to the floor, and yet can be easily straightened should it sustain greater damage. In style, the shade is built up from plastic tape and is derived from a design originated by the Scandinavian artist B. J. Gullberg.





Above left, a three-lamp trident fitting in satin gold anodised metal. Shades being in three colours. Each shade is mounted on a ball joint to permit movement to any desired position. Above, this robust and simple table model, with its shade of plastic tape, can be readily washed should it get soiled. Right, also of the same Swedish family, this ceiling fitting has a double shade. Here the tape can be patterned, contrasting with the plain variety in the previous fitting. Below, left, this ceiling fitting is representative of many variants of the triple lamp design. In this fitting another basic design—"the dustbin lid"—has been exploited to good effect, provides an attractive indirect source. Below, centre, the stand for this table model is decorated with wood rods, and the shade has a lattice of similar material.

overseas news

Development of Atomic Power

It is the Canadian Government's intention that the major power distributing companies in the Dominion shall be concerned in the development of power generation from nuclear energy, Mr. C. D. Howe, Canadian Minister of Trade and Commerce, told the House of Commons in Ottawa last week. The knowledge of Atomic Energy of Canada Ltd., the Crown organisation which operates the atomic energy project at Chalk River, is to be made available to power concerns, such as the Hydro-Electric Power Commission of Ontario, which would undertake the development, he said. Mr. Howe made the suggestion that atomic power might be supplied in remote areas where hydro-electric power was not available, and expressed the belief that the cost of atomic power, now higher than that of hydro-electricity, would be lowered as development took place.

Potential in N.B.

Development of New Brunswick's mineral resources may hasten construction of the $25 million Beechwood hydro-electric plant, Mr. E. Fournier, chairman of the New Brunswick Electric Power Commission said. The Beechwood project, one of several provincial sites in a proposed $125 million international hydro programme on the 450-mile St. John River can be developed without authority of the international commission, he said. A two-year survey had already indicated that some 192,000 h.p. could be generated at the site. Mr. Fournier added that construction of the plant was vitally necessary to meet normal load-growth increases and additional demands as the development of base metal finds in the Bathurst area progressed.

Capital for Development

To provide capital for expansion programmes of the Manitoba Power Commission and the Manitoba Telephone System, the Provincial Government has called for bids on $12 million debenture stock. Of that sum $6,400,000 have been earmarked for the Power Commission for the extension of rural electrification.

Expenditure in B.C.

The British Columbia Electric Co. plans to spend over $1,400,000 on the Jordan River hydro plant and normal electrical maintenance on Vancouver Island during 1953. In Greater Victoria conversion of the distribution system from 4,000 V to 12,000 V is to be continued while other work includes the construction of an outdoor substation at Langford and the rebuilding of a 60 kV transmission line. At the Jordan river plant new switchgear is to be installed.

Colombia Expansion

The electricity generating capacity of Colombia is expected to be increased by more than 50% this coming spring. The gain will result from three new hydro-electric plants now under construction at Lebrija, Anchicaya and Balsora. Construction of the first named plant began in 1947 and it was originally planned to be completed by 1951. The Anchicaya project, being built near Cali, is to have an installed capacity of 70 MW, and is largely to be utilised to transform the Canca river valley into a fertile agricultural area.

Brazil Project

A group of Norwegian engineers have obtained a contract to manage the construction of a large hydro-electric power plant in Brazil, estimated to cost about 150 million crowns. Technicians and foremen will leave shortly for Brazil. The plant is to be built in the mountains outside Bello Horizonte, about 500 kilometres north of Rio de Janeiro. Three Norwegian and two Brazilian contractors are co-operating on the task. The three Norwegian firms, Astrup and Aubert A/S and Thor Furuholmen of Oslo, and A/S Betongbygg of Trondheim, have combined in a joint concern "Norconstruction." Brazilian labour will be used on the work, which is expected to take about two and a half years to complete.

Yugoslavia Power Exports?

The possibility that Yugoslavia, with a hydro-electric potentiality estimated at 50,000 million kWh, could export power to Italy, Austria and Western Germany, is to be studied by a group of experts from four countries on behalf of the United Nations Economic Commission for Europe. The study is to be divided into four groups of problems: economic, technical, financial and legal. It may be recalled that the report of the U.N. Economic Commission for Europe which we dealt with in our October 2 issue, showed that Yugoslavia was one of three European countries who could guarantee regular exports of hydro-power without prejudicing internal consumption for any length of time. It is estimated that the productive capacity of sites so far developed is only about 3% of the total possible output. The development of the Coastal section of the Dinaric Alps would provide a considerable amount of winter power, while construction costs would seem to be relatively low, owing to the characteristics of the natural sites. On the basis of the 1950 population figures, the complete harnessing of Yugoslavia's hydro potential would provide about 3,000 kWh per head per annum. In addition, the country also

possesses solid fuel resources which enhance its overall power potential. The report envisages that power transmission at 220 kV or 380 kV would span the 400 kM from the centre of the production sources to the Italian frontier, or development of the submarine cable technique would permit the export of power across the Adriatic to Southern Italy.

Relieving the Rates

The possibility that the Cape Town Electricity undertaking might not make its usual generous contribution to the general rate fund during 1953, but instead might need a £6,000 subsidy from the rates, startled the Corporation Finance Committee, we gather. The Finance Committee, which has wide plenary powers, has rejected the suggestion, maintaining that the cost of production of electricity justified an increase in tariffs, and called for a contribution of £420,000 from the undertaking to the rate fund. A memorandum submitted by the chairman of the Finance Committee, Major A. Z. Berman set out the arguments for this increase. But a slight concession has been made to the Electricity Department whose contribution to the rates has been reduced to £345,000. As a result electricity charges are to go up. The Council has now approved an increase in the rooms charge from 1s. 4d. to 1s. 10d. per month, with the unit price being raised from ½d. to ⅝d. The lighting rate for shops and outside lighting is also increased by ¼d. per unit, and there is to be a charge for new connections.

Kafue Gorge Approval

The Kafue Gorge hydro-electric scheme, the consultants' report of which was reviewed in our February 12 issue, has now been unanimously agreed to by the Northern Rhodesian Legislature Council. A motion by the Economic Secretary, Mr. R. A. Nicholson, was approved, authorising the Government to begin immediately to secure the capital needed for the project, and to take action to see that it is constructed within the period of six years nine months specified by the consultants. The latter recommended a two-stage development each with a power station having four 43 MW generating sets.

Aswan Dam Contract

At long last the Egyptian authorities have decided to place the contract for the main civil engineering work of the Aswan Dam hydro-electric scheme. They have accepted the tender, amounting to E£10,342,000, of a group composed of two French firms, Grands Travaux de Marseille and Schneider et Cie. This contract includes construction of the forebays, coffer dam, a new intake dam, power station, and four tunnels. The power station is to be equipped with seven 65,000 h.p. turbines and two auxiliary turbines of 16,000 h.p. each, and these machines, which were ordered some years ago, are now nearing completion, we understand. The principal consultants are Kennedy and Donkin, and Mr. Geoffrey Kennedy, who returned from Cairo last week when the civil engineering contract was placed, tells us that the target date for operation of the hydro-electric scheme is now July, 1957.

Owen Falls Progress

The third stage of the diversion work on the Nile at Owen Falls, which was carried out last week, now permits construction of the second half of the main dam across the river for the hydro-electric scheme of Uganda Electricity Board. At last week's ceremony, attended by the Governor of Uganda, Sir Andrew Cohen, the temporary coffer dam was demolished. The western half of the main dam has already been constructed, and work is now being concentrated on the eastern half.

Bokaro Power Station Opened

The Bokaro steam power station—the second large achievement in India's five-year plan—was formally inaugurated by Mr. Nehru last Saturday. Situated in Bihar, on the north bank of the Konar river, the station now houses three 50 MW American G.E. single-cylinder turbines, each coupled to a hydrogen-cooled alternator. Ultimate capacity of the station is to be 200 MW. For each of the generating sets there are two 300 klb/hr boilers made by Combustion Engineering Superheater Inc., of New York. On Saturday, Mr. Nehru also opened the Tilaya dam, which, like the Bokaro power station, is part of the Damodar Valley multi-purpose scheme, one of the main features of which is the establishment of eight hydro-electric stations with a total ultimate capacity of 210 MW, of which about one-half will be firm power at 60% load factor. The Bokaro steam station, however, will operate as base load for about 37 weeks in each year.

A New Laboratory

The Electro-Chemical Research Institute at Karaikudi, Madras, was formally opened by Dr. Radhakrishnan, vice-president, recently. Set up with a view to rationalising industry and bringing to light new methods and techniques, the Institute, which stands on a 300 acre site, is one of the laboratories intended to further the use of electricity for increased industrial production. The location of the Institute, in Karaikudi, a town in the heart of Tamil Nad, was decided on in 1948. Part of the cost has been donated by Dr. A. Chettiad.

Parsons' Factory for S.A.

C. A. Parsons and Co., Ltd., have decided to establish a subsidiary company at Whysalla, South Australia, for the production of equipment for power stations, we learn. Main turbines and alternators will still be made at the Heaton Works at Newcastle-upon-Tyne, apparently, and Mr. D. P. Walton, secretary of the company, tells us that condensing plant and feed heating equipment will be manufactured at Whysalla, based on the designs of the parent organisation.

PERSONALITIES

IN THE INDUSTRY

Two new appointments are announced by Bakelite Ltd. **Mr. W. E. Pattman** is to be purchasing manager, and **Mr. J. M. Lassen** is now sales manager, Vybak p.v.c. materials. Mr. Pattman joined the former Damard Lacquer Co. in 1921, and soon after its transformation into the present company became assistant to the works manager. Later he took up the post of sales development engineer and started the company's Sales Development Department. During the war he was seconded to the Plastics Control Section

Mr. W. E. Pattman

Mr. J. M. Lassen

of the Ministry of Supply, returning in 1945 as sales development manager. In this capacity he has travelled abroad widely, and has paid a number of visits to India where he has taken an active part in establishing Hyderabad Laminated Products Ltd., who are pioneers in the manufacture of laminated sheet in that part of the world. Mr. Lassen joined the company as an engineering trainee in 1940, and returned in 1946, after war service, to the new Vybak thermoplastics unit, where he has since been concerned with developing sales of these materials.

To mark his fiftieth year with the Electric Construction Co. Ltd., **Mr. Harry Jackson,** deputy foreman, machine erection shop (small and medium size machines), was recently presented with a gift of Savings Certificates by **Mr. W. M. B. Furniss,** assistant managing director, who is seen on the right of our accompanying photograph. **Mr. E. H. Vincent,** works manager, is on the left. Mr. Jackson was responsible, *inter alia*, for the installation of the filament motor generator sets at the B.B.C. h.p. station, Daventry, in 1925, as well as the installation of similar sets in various other B.B.C. stations. He has also installed the company's power equipment in many G.P.O. Telephone Exchanges.

Mr. W. M. B. Furniss, right, making the presentation

Messrs. **R. L. Basset, W. G. Patterson, C. J. N. Borg** and **H. E. Humphries** have joined the board of Alfred Graham and Co., Ltd. **Sir Hubert Gough** having relinquished his seat on the board, **Mr. H. E. Humphries** has been elected chairman. **Dr. J. N. Aldington** has been appointed executive director, **Mr. E. E. Smith** having relinquished the managing directorship to become consultant director.

Mr. G. B. Alvey has been invited to accept a seat on the board of directors of Mather and Platt, Ltd. He was at one time in charge of the firm's Electrical Design Department, and during recent years has been in charge of the electrical section of the company's business. He will continue to be responsible for the work of the Electrical Department.

Mr. C. A. Smeed, L.R.I.B.A., M.Inst.R.A., civil engineer and architect, of the Eastern Division, retired earlier this month, after having served 39 years in the industry. Prior to vesting day he held a similar post with the Northmet Power Co. and was responsible for the design and building of the majority of the Northmet showrooms and offices and approximately 1,000 substations. Mr. Smeed was also responsible for the design of Rye House generating station and supervised the whole of the civil engineering works. He will shortly be living in Brighton, we understand.

The council of the Institute of Welding has awarded the Sir William J. Larke Medal for 1952 to **Mr. J. Rannie,** M.Sc., M.I.N.A., for his paper "Shipyard Changes, with Special Reference to Steelwork Construction in Oil Tankers." Mr. Rannie is welding engineer to John Brown and Co., Ltd.

Mr. G. C. Handley has been appointed London area manager for Contactor Switchgear Ltd. He will operate from 68 Victoria Street, S.W.1.

Two further appointments to the board of C.A.V. Ltd. are announced, following the recent retirement from executive duties of Mr. Cadwaller, and the appointment of Mr. H. G. Mason as joint general manager. They are **Mr. G. G. Savill** and **Mr. L. R. Johnston.** Mr. Savill joined the firm as an apprentice in 1916, and after serving in the laboratory, transferred to the Sales Department as a technical representative. In 1939, Mr. Savill, who was a territorial, was called up and served with the rank of major, as assistant to the chief inspector of electrical and mechanical equipment. He returned to C.A.V. in 1946 and took a leading part in developing equipment for the Services. Mr. L. R. Johnston, who joined the company in 1937 as a chartered accountant, has been secretary of the company since 1947.

Mr. G. G. Savill

Mr. Miles Beevor, managing director of the Brush Electrical Engineering Co. Ltd., left England last Friday on a fact-finding tour of India. He hopes that before his return on March 25 he will also have an opportunity to visit Pakistan. In India, Mr. Beevor will discuss market possibilities with Government Ministers, manufacturing associates and agents of the Brush Aboe Group. He will be visiting Delhi, Calcutta, Madras, Bangalore, Bombay, Poona, and possibly Karachi.

Chairman of the London Transport Executive since August 1947, **Lord Latham** has indicated that he intends to return to his professional practice when his present term of office as chairman expires at the end of September. Lord Latham, who is an accountant, gave up all his commercial interests, including the chairmanship of nine companies, when he joined the L.T.E.

Mr. D. R. P. Baker has been appointed secretary of the Barbados Electric Supply Corporation Ltd., in place of the late **Mr. A. W. R. Lovering** who was director and secretary.

It is announced by Johnson and Phillips Ltd., that **Mr. Frank Greenshields,** A.M.I.E.E., A.M.(Amer.) I.E.E., will be leaving for Australia tomorrow, February 27, to take up duties at the company's Sydney branch. Mr. Greenshields is well known in London area sales circles and has been a senior member of the J. and P. London sales staff since 1947.

OBITUARY

Mr. Herbert G. Leivesley, M.I.Mar.E., A.M.I.E.E., late of Metropolitan-Vickers Electrical Co. Ltd., died on February 14. He retired at the end of September, 1949, after 27 years service at Trafford Park. Prior to 1922 he had been with the Southport Electricity and Traction Department, and Messrs. Vickers-Armstrongs, Ltd. In that year he joined the newly formed Marine Department of Metropolitan-Vickers Electrical Co., Ltd., at the Trafford Park Works, of which he was later assistant manager. From 1935 until his retirement he was liaison officer between M.-V. and Vickers-Armstrongs.

Mr. E. B. Hall, chairman and managing director of Hall and Pickles Ltd., died on February 11.

Mr. F. Greenwood, who controlled the business of the Thames Electric Co. Ltd. from 1940 until retiring because of ill health in 1949, died on February 9, aged 79. Earlier, he had been a manufacturers' agent and electrical importer, during which time he was actively engaged in organising with the Board of Trade in connection with the first British Industries Fair.

Mr. Henry D. Hope, a director of Chamberlain and Hookham Ltd., and of a number of other concerns, died on February 13, aged 84.

Mr. H. Collard, who retired from the position of mains superintendent with the borough of Southwark Electricity Department in 1931, died recently, aged 86.

Mr. H. B. Fergusson, M.I.N.A., M.I.Mech.E., M.E.I.(Canada), senior director of G. A. Harvey and Co. (London), Ltd., died on February 27. He was educated as a mining engineer in Germany but later went to Canada, becoming a partner in a firm of consulting engineers. After the 1914-18 war he spent four years in Spain as consulting engineer on hydro-electric plants and railway electrification projects. There followed a spell in South America and again in Canada on various engineering projects before joining G. A. Harvey and Co. (London), Ltd. in 1933 as manager of their Heavy Construction Department. He became a director in May, 1938.

Mr. J. W. H. ("Jimmy") Livett, who was chief of technical sales (switchgear) to Johnson and Phillips Ltd. for the past 13 years, died recently, aged 57. He had been with J. and P. for 43 years and had represented the company on B.E.A.M.A. Switchgear Committees.

Wills.—Mr. A. Charles, M.B.E., managing director of Smith Meters, Ltd., and inventor of numerous patented devices concerning electricity meters, left £28,171 gross (£27,438 net value).

Mr. J. F. Driver, M.I.Mech.E., M.I.E.E., D.L.C., editor and a director of "Machinery Lloyd," and formerly for many years head of the Department of Electrical Engineering at Loughborough College, left £5,885 gross (£5,793 net value).

Mr. S. W. Melsom, M.I.E.E., former technical officer to the Cable Makers' Association, left £2,296 gross (£2,236 net value).

NEW LITERATURE

Artificial Light and Photography

by Dr. G. D. Rieck and Ir. L. H. Verbeek

AT some time in the life of every amateur photographer there comes a desire to take pictures under artificial light. To the Press and the professional photographer, such work is, of course, commonplace. Yet both amateur and professional frequently have to learn by trial and error or rule of thumb methods, involving numerous failures and considerable expense before proficiency in this medium is obtained. In this book the authors have tried, with considerable success to provide all the information required to take good pictures indoors. The contents, however, are more comprehensive than would at first sight be necessary for a work purely devoted to photographic techniques, and provide what is in effect a thorough grounding in the fundamentals of light and lighting, photo sensitivity of films, colour response, construction, and operation of incandescent lamps, gas discharge lamps and flash bulbs, positioning and adjustments of lamps for lighting the subject, synchronising and use of flash bulbs, reproduction, and enlarging and processing. Thus it is, in effect, a comprehensive handbook on photography and light sources, although camera construction and operation are largely omitted. For the amateur engaged in competition work, and even for the established professional, the information given is of great value. Published by Philips Technical Library and distributed in Great Britain by the Cleaver Hume Press Ltd., 42a South Audley Street, W.1, 360 pages, 7 in. by 11 in. Price 52s. 6d.

Television

by F. Kerkhof and W. Werner

THE books produced by Philips Technical Library have so far maintained a remarkably high standard, both of subject matter and presentation, and this volume is no exception to the rule. It consists fundamentally of the information contained in a course of lectures, which was given by Prof. F. M. Roeterink, head of Philips Technical Training Centre, to technicians training for development work in television technique, and the subject matter has been arranged to allow for an easy transition, for those already familiar with radio engineering, from that field, into television. Although principally concerned with receiver design, enough information has been included on transmitters to permit the reader to gain a good idea of the manner in which the television signals are generated.

The contents of the volume begin with a general review, going on to the physical principles of electronic scanning, including a small section on electron optics. Pick-up and picture tubes are then discussed and the actual waveforms used for transmissions are investigated. After this, the circuits used in the receiver are dealt with in considerable detail, and the question of transmission lines and aerials is introduced. Published by Philips Technical Library. Distributed in U.K. by the Cleaver Hume Press Ltd., 434 pages, 6 in. by 9 in. Price 50s.

Modern Electric Lamps

by D. A. Clarke

IN accordance with recent trends in illumination, the main concern of this addition to the publisher's "Electrical Engineering" series, is with discharge lamps. On this topic the author achieves his greatest success in presenting a development of the essentials of gaseous discharge physics. This treatment should prove most useful to engineers who wish to appreciate the general principles involved. This section of the book is preceded by a brief discussion of the nature of light, and a chapter tracing in some detail the manufacture of the modern filament lamp, and is followed by descriptions of the more common type of discharge lamp, with particular attention to the fluorescent lamp, the h.p. mercury lamp and the sodium vapour lamp. Final chapters deal with recent high-intensity lamps, the principles of illumination, and colour in lighting. Published by Blackie, 205 pages, 8¼ in. by 6 in. Price 20s.

The Engineer Buyers' Guide, 1953

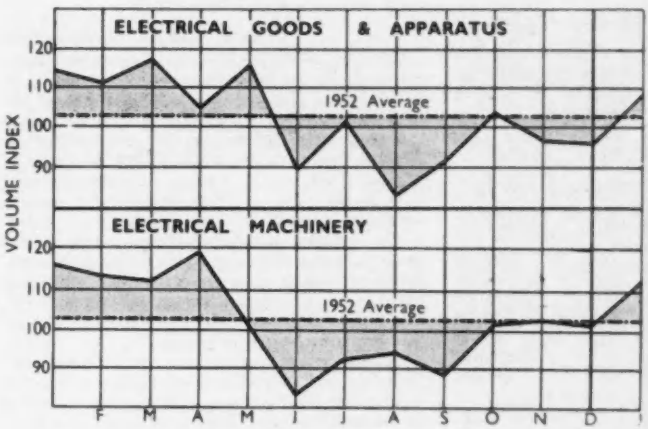
SUPPLIERS of a wide variety of engineering products and services are listed in the latest edition of this annual which has been renamed to convey more accurately its content and purpose. Lists of names and address, trade names, and associations connected with the engineering industry are included, but it must be emphasised that although quite comprehensive, this buyers' guide is by no means complete. Published by *The Engineer*, 602 pages, 5¼ in. by 8¼ in. Price 5s.

Data and Circuits of Radio Receiver and Amplifier Valves

by N. S. Markus and J. Otte

A SEQUEL to books II and III in the Philips Electronic Valve Series, this book (IIIA) contains descriptions and data of receiving and amplifying valves brought out by this company in the years 1945-50. In it the "Rimlock" valves are given a prominent place and considerable attention is given also to miniature battery-operated valves and others of the "Noval" type. One of the virtues of this book, in common with its predecessors, is that supplementary information is supplied indicating applications of new valves, with circuit diagrams of receivers providing complementary illustrations. Users of the book should find useful the large scale to which all charts and graphs have been drawn, making for increased legibility. A concluding section of the book provides useful descriptions of new auxiliary and test equipment. Published for Philips Technical Library by Cleaver Hume, 487 pages, 9 in. by 6 in. Price 40s.

EXPORTS AND IMPORTS



EXPORTS VOLUME INDEX

After their seasonal fall in December, exports of electrical goods and apparatus recovered again during January, indicated by the "Electrical Times" volume index, which stands at 108, compared with the previous month's 97 (1950—100). Although not so high as that for January last year, it is the highest since May's index of 115. The value of exports in this class amounted to £9,689,388.

A similar rise is to be seen in exports of electrical machinery, the volume index having risen from 102 to 112 (1950—100). This again is somewhat below last year's corresponding figure. In value, exports of electrical machinery were £5,373,010.

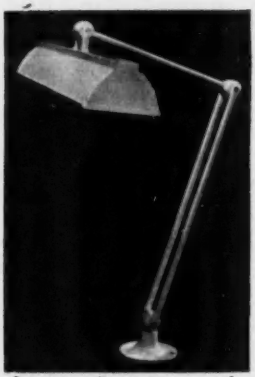
LAST month's exports of all electrical goods showed a welcome increase in value. Of the cooking and heating appliances sent abroad in the month, electric irons alone amounted to £37,062 in value and complete cooking appliances to £89,856. Australia was our best customer for generating plant, taking equipment to a value of £345,466, while India accounted for £222,961 of the value and Spain for another £208,625 worth. Complete vacuum cleaners valued at £95,274, were shipped (compared with £236,501 in January, 1952). while exports of electric washing machines of not more than 150 lb in weight totalled £162,194, and those between 150lb and 250lb, £130,428.

Description	Exports Value Month of January			Imports Value Month of January		
	1951	1952	1953	1951	1952	1953
	£	£	£	£	£	£
Telegraph and Telephone Wires and Cables—						
Submarine	35,921	60,234	12,171	—	—	—
Other	641,258	541,496	644,599	—	—	—
Rubber Insulated	458,418	761,467	538,176	—	—	—
Insulated, other than Rubber	947,578	1,237,377	1,941,425	—	—	—
Wireless Apparatus, including Valves ...	1,598,174	2,156,651	1,968,973	270,163	273,406	258,043
Telephone and Telegraph Apparatus ...	1,442,324	1,628,251	1,896,849	—	—	—
Electric Lighting Appliances, Accessories, Fittings and Parts:—						
Filament Lamp Bulbs	125,125	173,645	83,505	13,847	11,222	8,068
Other Descriptions	354,018	502,326	462,704	37,150	58,229	57,958
Batteries (primary)	177,768	264,676	190,224	—	—	—
Accumulators, Portable	320,933	398,410	198,461	—	—	—
,, Stationary	35,534	45,632	54,693	—	—	—
,, Parts and Accessories ...	62,174	84,778	65,144	—	—	—
Electrical Cooking and Heating Appliances...	327,522	543,844	289,069	—	—	—
Ammeters, Voltmeters, etc., and Parts ...	126,933	137,535	128,592			
House Service Meters	132,192	149,543	95,063	37,360	43,981	56,200
All Other Instruments	152,000	120,381	155,933			
Electro-Medical Apparatus	54,395	52,351	35,240	—	—	—
X-Ray Apparatus, etc.	121,610	206,206	180,320	24,701	52,886	29,865
Insulating Materials	193,126	251,373	97,675	—	—	—
All Other Articles	435,031	778,886	650,572	90,980	168,787	94,457
Total of Group	7,742,007	10,065,062	9,689,388	474,101	608,511	504,591
Electrical Machinery:—						
Generating Sets, Diesel (not exceeding 200 kW)	369,914	441,383	335,365			
,, ,, ,, (exceeding 200 kW) ...	175,924	169,688	91,475	49,451	48,061	50,406
Other Generating Sets	328,360	305,453	170,038			
Generators minus Prime Movers and Parts	224,343	616,872	1,184,900			
Motors	843,934	1,084,389	901,007	23,630	46,928	63,518
Convertors, Transformers, Rectifiers, Motor Control Gear, Switchgear, other machinery	1,585,758	2,453,436	2,690,225	6,770	18,426	84,803
Fans, Electrically and Power Driven ...	141,175	232,712	267,789	—	—	—
Vacuum Cleaners or Electrically Operated Appliances	387,460	659,209	295,254	—	—	—
Total Appliances and Machinery ...	11,799,005	16,028,204	15,625,441	553,952	721,926	703,318

The BUYER'S *Column*

Spot on with the "Spotline"

A RANGE of adjustable reflector fittings for use with 2 ft and 4 ft fluorescent lamps has now been introduced by LINOLITE LTD., 118 Baker St. London W.1, under the name "Spotline."



3-point adjustment on the "Spotline"

This has been introduced to meet several requests for the supply of the company's range of Linora small sectioned fluorescent lighting reflectors with fully articulated adjustment for local lighting purposes.

These new "Spotline" reflectors are available for use with 18 in. 15 W, 2 ft 20 W and 4 ft 40 W fluorescent lamps. The control gear may be fitted remotely or housed in a combined base and control gear-case to make a self-contained unit.

Particular care has been taken to ensure that the unit provides instant adjustment to a wide combination of angles and to ensure that the reflector remains in the selected position.

The reflector made from aluminium has a 4¾ in. width providing the regulation 20° cut off.

The length of the three-point pivot arms varies with the different models as do total expansions which are 24, 30 and 42 in.

Prices change again

NOTICES of a number of reductions in price have reached us from the manufacturers noted underneath. For convenience we have tabulated the reductions as under.

HOTPOINT ELECTRICAL APP. CO. LTD., Peterborough.

Model H.30 refrigerator	Red. to £106 2s. inc. tax. W./E. Feb. 23.

GENERAL ELEC. CO. LTD., London W.C.

F.36570 and 36568 fluorescent fittings	Red. by 15s. complete.
F.36571 and 36569 fluorescent fittings.	Red. by 15s. complete.

FOSTER TRANSFORMERS LTD., Wimbledon.

H.V. Test Set, Model A	Red. to £49 10s. complete.
H.V. Test Set, Model B	Red. to £56 complete
H.V. Oil Test Set (to B.5148/51)	Red. to £98 complete.

AERIALITE LTD., Stalybridge.

Model 82 TV Aerial	Red. to £1 4s.

Colour and the Coronation

THE use of the Royal Coat of Arms in decorations for the forthcoming celebrations will be widespread. The Coronation Committee of the Council of Industrial Design have approved a mounted reproduction in full colour from a Trapinex paint transfer of the simplified design of Milner Gray, R.D.I., F.S.I.A., and this is being sold as a guide to manufacturers in making souvenirs, decorations, etc.

The detailed traditional Royal Arms carries many colours and shades which do not lend themselves so readily to reproduction, particularly in small sizes. TRAPINEX LTD., 335 High Road, London, N.22, have therefore carried out an interpretation in twelve colours.

Several sizes of both of these designs in Trapinex Transfers are immediately available for window display and other schemes. They are also supplied as mounted reproductions on coloured board.

Tunion Flex Connector

SAFETY considerations have prompted GEORGE TURNOCK LTD., Tunion Works, Navigation St., Walsall, Staffs, to fit a wire springing clip to their T.M.14A flexible cable connector. Interlocking with the other half of the conductor the clip prevents the possibility of the connector being dragged apart by accident.

Neco S.W. Geared Motor

WE are asked by NORMAND ELECTRICAL CO. LTD., North St., Clapham Common, London S.W.4 to point out that their Type S.W. Geared Motor has a maximum torque output of 25 lbs/ft and not 56 as we erroneously stated in our issue of February 12.

S.B.'s Springloaded Tube-Holder

FOLLOWING our recent editorial note on the introduction of a retractable springloaded fluorescent lampholder SMART AND BROWN LTD., 105 Judd St., W.C.1, write to remind us that they have for a number of years past marketed their LK 405 springloaded bi-pin fluorescent lampholder which is similarly moulded in white plastic, is 1¾ in. in diam., 1¼ in. extended length allowing for ¾ in. length of navel on the springloaded part which incorporates four independent spring action; 12-in. wire tails are fitted for making connections. The LH405T is similar but instead of wire tails the terminals in the base are made accessible from the side.

This S.B. holder is springloaded

Medical and Industrial Lamps

THREE special lamps now added to the range of "V" (DEVELOPMENT AND TRADING) LTD., 22 Clifton Road, London, W.9, are, first, the "Theratherm" short-wave luminous infra red lamp which has an internal reflector to concentrate the deeply penetrating rays, is rated at 300 W with e.s. cap.; secondly, a mercury h.p. "Black Light" lamp. The envelope is made from dark violet filter glass and is considered suitable for use in conjunction with the fluorescent paints for display effects and theatre use. This lamp is also said to be of use in medicine in the detection of subcutaneous diseases, and in forensic science.

We understand that the firm will soon introduce a new type of daylight lamp designed primarily for the textile and dyeing industries where colour determination is important. It is a new high pressure discharge lamp filled with Xenon. The envelope is drop shaped and is 5 in. in length. This lamp which we understand has an almost continuous spectrum emits light which is said to be close to natural daylight.

Nylon Bearing Bush Replaces Metal

THE Witton Moulded Insulation Works of the GENERAL ELECTRIC CO. LTD., are now moulding in nylon small bearing bushes for the wringers of washing machines which were formerly made in metal. Preliminary reports from Wilkins and Mitchell, Ltd., the manufacturers of the washing machine, on this new development indicate that the change has proved satisfactory.

The change was made because lubrication by oil (which is necessary in a metal bearing) is not the ideal method on a washing machine, since the detergents used in washing soon disperse the oil. Nylon, on the other hand, is lubricated by water.

The bearings are injected-moulded in a 10-ton hydraulic press with an injection pressure of 7 tons per sq in. The moulding cycle time is $\frac{1}{4}$ minute. Internal diameter of the bearing is $\frac{1}{2}$ in.

TRADE PUBLICATIONS

MOTORS.—A revised and enlarged publication issued by Laurence Scott and Electromotors Ltd., 431 Grand Buildings, Trafalgar Square, W.C.2, deals with the N-S variable-speed a.c. motor.

ELECTRONICS.—Publication No. 266 issued by Evershed and Vignoles Ltd., Acton Lane Works, Chiswick, London W.4, describes the range of electronic repeater equipment made by the firm.

ALUMINIUM PASTE.—A new publication by The British Aluminium Co. Ltd., Norfolk House, St. James's Square, London S.W.1, deals with the uses of B.A. aluminium paste as a paint in industry and on exterior applications such as bridges, ships, etc.

CONDENSERS.—Latest bulletin issued by Telegraph Condenser Co. Ltd., North Acton, W.3, features condensers for television receivers.

RADIO VALVES.—The third edition of Mullard's comprehensive valve price list has recently been published. It covers all those valves and television tubes introduced since 1951, and is available from the firm's Publicity Department at Century House, Shaftesbury Avenue, London W.C.2.

TELEPHONE EQUIPMENT.—Mine telephones and signalling equipment is featured in a new catalogue issued by Automatic Telephone and Electric Co. Ltd., Strowger House, Arundel Street, London W.C.1.

FLOOR CLEANING.—Electric floor scrubbers and polishers are a speciality of Cimex Fraser-Tuson Ltd., Cray Avenue, Orpington, Kent. Their range is described in a recent issue by the company.

TELECOMMUNICATIONS.—Unit construction practice as applied to the telephone and telegraph transmission systems is described in a joint A.T.E./T.M.C. publication distributed by Automatic Telephone and Electric Co. Ltd., Strowger House, Arundel Street, London W.C.1.

CABLES.—Arc welding cables are the subject of a new folder by the Edison Swan Electric Co. Ltd., 155 Charing Cross Road, London W.C.

DOMESTIC APPLIANCES.—Catalogue No. 455 just issued by the Wholesale Fittings Co., Ltd., 46-50-52 Commercial Street, London E.1, gives details of the range of appliances which the firm is able to supply.

ELECTRONICS DATA.—A technical data service for the benefit of engineers engaged in the design of radio and industrial electronic apparatus, has been introduced by the General Electric Co., Ltd., Magnet House, Kingsway, W.C.2. It consists of the distribution of a loose-leaf binder and issues of data sheets to keep it up to date.

BATTERIES.—The Tudor range of open and sealed type Planté stationary cells for emergency lighting and power and for all d.c. duties in industry is the subject of a new edition of Catalogue No. 66/A just published by the Tudor Accumulator Co., Ltd., 137 Victoria Street, London S.W.1.

ACCESSORIES.—A new price list issued by Ashley Accessories Ltd., Ulverston, Lancashire, gives details of prices of all items in the firm's range as from February 17.

METAL FOUNDRY.—A Buyers Guide listing all foundries' licences to operate the Meehanite Metal Process, both in this country and overseas, is available from International Meehanite Metal Co., Ltd., 66 Victoria Street, London S.W.1.

DISTRIBUTION EQUIPMENT.—Medium voltage underground joint and service boxes are described in Publication No. 309 recently published by British Insulated Callender's Cables Ltd., Norfolk House, Norfolk Street, London W.C.1.

RECTIFIERS.—Bulletin F/SRT.1, Edition 6, issued by Standard Telephones and Cables Ltd., Warwick Road, Boreham Wood, Herts, gives information on codes, dimensions and weights of rectifier stacks.

COMPUTING MACHINES.—Literature received from the U.S.A. gives information on the Instron Integrator, a product of the Instron Engineering Corporation, Quincy 71, Massachusetts.

Electricity and Eye Surgery

New Flash-Tube and Magnet Aid Diagnosis and Treatment

A NEW flash-tube, the Mazda FA.5, has recently been developed by the British Thomson-Houston Co. as an aid to the diagnosis and treatment of eye troubles. This permits the photographing, in colour, of the retina of the eye, a problem which has hitherto been difficult of solution due to the intense illumination required, together with the short exposure time necessary to avoid blurring and bad definition caused by uncontrollable eye movements during the exposure.

This photograph of the new flash-lamp being demonstrated was taken by the light from the lamp itself

At the moment the new lamps are being used by Dr. Hansell of the Institute of Ophthalmology, and it is thought that colour photography may soon become a routine part of preliminary investigation into diseases of the eye.

Apart from its ophthalmic use, the flash-tube has also a number of uses in medical research, particularly in biological work, where it permits investigators to obtain pictorial records of changes in the living cell.

The construction is fundamentally simple, consisting of a cylindrical hard glass envelope with an electrode sealed into each end to form an arc gap of only a few millimetres. Xenon gas is contained within the lamp at a pressure of about one atmosphere, and when the lamp is operating continuously it consumes about 150 watts and has a light source of approximately 4-5 mm long and 2·5 mm wide. The brightness of this source is estimated as a maximum of 60,000 candles per sq in.— somewhat greater than that of the sun. Enquiries concerning the lamp have already been received from laboratories in the U.S.A. and from Zeiss in Germany, so there is every chance of export orders resulting from this important development.

Removing Metal

A new electro-magnet for removing ferrous particles from the eye has also been developed by B.T.H. research engineers, working in collaboration with doctors at the Moorfields Eye Hospital. This weighs only 13 lb and is more powerful than any of the existing larger magnets designed for the purpose, some of which are as heavy as 100 lb. By its use, small metallic particles may be removed from the eye with less danger than before of causing further damage to the tissues. An interesting fact which was discovered during the research work leading to the development of this instrument was that size itself appeared to have no direct importance in achieving the high attractive force required; the most relevant factors affecting this were the shape of the magnet and its input power.

Low Current Demand

Although as yet in the experimental stage, it has already demonstrated its superiority in operation, and production is expected in about six months' time. One of its great advantages particularly to the private surgeon is that it can be operated from a domestic power point.

Manufacture and marketing of the magnet when it eventually becomes available will be carried out by the Newton Victor Co., who specialise in the field of electrical equipment for medical and surgical use.

BRITISH STANDARDS

Hacksaw Blades. *B.S.*1919: 1953. *Price* 3*s.* 6*d. net.* A new standard, this publication has the advantage that its provision for ranges of sizes, teeth and dimensions are identical with those accepted by American and Canadian manufacturers. Blades for hand and power operation are covered, specifications being designed to ensure high quality in addition to a reasonable degree of physical uniformity.

Filmstrip and Lantern Slides. *B.S.* 1917 : 1952. *Price* 2*s.* 6*d.* In respect of filmstrip, this new standard supersedes B.S. 777 : 1947. Provision is now made for three nominal picture sizes on 35 mm perforated film. The essential dimensions of the filmstrip include the length of the leaders and the sizes and arrangement of the frames. In respect of lantern slides, it supersedes the requirements for miniature (2 in. × 2 in.) slides which appeared in B.S. 777 : 1947, and those for 3¼ in. square lantern slides which appeared in B.S. 379 : 1930. It also includes a 2¾ in. square "intermediate" lantern slide, a size of slide which originated in America and which is now becoming increasingly used in Great Britain and on the Continent.

It details the essential dimensions of the completed slide, the cover glass and the maximum projection area, and specifies the single thumb mark as the single method of position indicator for the miniature and for the 2¾ in. square slide. In the case of the 3¼ in. square slide, both the "2 spot" method and the single thumb mark position indicator are permitted as alternatives, but a preference is expressed for the thumb mark position indicator, so that uniform method may apply to all three sizes of slide.

Heavy duty, electro-magnetically operated, single pole circuit-breakers for extra-low voltage d.c. systems in aircraft. *G.*142: 1953. *Price* 2*s.* 6*d.* This standard covers circuit-breakers rated at over 50 amps and up to 400 amps incorporating overcurrent tripping. Particular requirements include operation, mechanical latching, and operating voltages. Type tests as specified in B.S. G.100 are included in addition to others covering operational performance and production.

Low tension flexible electric cords and cables. *B.S.* 4*E.*3: 1920. This standard has now been withdrawn.

Woven Asbestos Tape for Electrical Insulating Purposes. *B.S.* 1944: 1953. *Price* 2*s.* 6*d. net.* This new British Standard for plain unimpregnated woven asbestos tape used as insulating material follows a previous standard, B.S. 1720 : 1951, on woven asbestos tape for electrical purposes. As in this earlier standard, the new standard, based on information supplied by the E.R.A., does not cover those tapes having an all-cotton warp or weft. Apart from mechanical and electrical properties, specifications include requirements for finish, dimensions and strength of tape together with appendices describing test methods to determine compliance with the specification.

Copper for Electrical Purposes. Sheet and Strip. *B.S.* 1432: 1953. *Price* 4*s. net.* The principal feature of this revised edition is the inclusion of two diagrams of recommended sizes for sheet and strip copper for transformers and rotating machine windings. Added to encourage designers to choose from them for their requirements, it is hoped that these diagrams will effect a reduction in the number of sizes demanded. Provisions for annealed, half-hard and hard conditions of copper are specified, and in addition a further provision enables the purchaser, by arrangement, to specify oxygen-free, high conductivity metal.

Oil Burning Equipment. *B.S.* 799: 1953. *Price* 10*s. net.* A revision of B.S. 799: 1938, this standard has now been extended to include semi-automatic and hand-controlled equipment suitable for petroleum oils of various other grades of B.S. 742 and for coal tar fuels conforming to B.S. 1469. Although the standard applies to oil-burning equipment for boilers, heaters, furnaces, ovens and similar plant, it is not intended to cover mobile or marine installations.

Flexibly Mounted Instrument Panels for Fixed Wing Aircraft. *B.S.G.* 141: 1953. *Price* 1*s. net.* A new publication, this British standard specifies the requirements for instrument panels insulated from vibration of the surrounding structure by means of flexible or resilient mountings, in accordance with the requirements of British Standard G.100, "General requirements for electrical equipment and indicating instruments for aircraft."

D.C. Linear and Rotary Actuators for Aircraft. *B.S.G.* 143: 1953. *Price* 2*s.* 6*d. net.* In this new British standard are specified the general design and test procedure for two types of electrically-operated d.c. rotary and linear actuators for aircraft as follows:

Type A.—Suitable for operating over terminal voltage range of 22-29 V d.c. on a nominal 28 V d.c. supply, or over a range of 88-116 V d.c. on a nominal 112 V d.c. supply.

Type B.—Suitable for operating over terminal voltages of 18-29 V d.c. on a nominal 28 V d.c. supply or over a range of 72-116 V d.c. on a nominal 112 V d.c. supply. (This covers additionally the conditions of battery operation, including those of heavy discharge.)

British Standards reviewed above may be obtained at the prices stated from the British Standards Institution, 24 Victoria Street, London, S.W.1.

The WEEK in NEWS

Australia relaxes Import Cuts

Some Relief for Hard-hit Domestic Appliance Industry

DETAILS of Australia's relaxation of import restrictions were announced by the Minister of Trade and Customs, Senator N. O'Sullivan, in Canberra, soon after we went to press last week. The original cuts imposed last March probably hit the import of domestic appliances hardest of all, and consequently it is a relief to note that goods in that category may be imported at 30% instead of 20% of the base year imports. The base year was 1950-51. Included in the list of commodities in this class are washing machines, dish-washing machines, refrigerators, floor polishers, radio sets, fans, lamps, cookers and clocks. As regards goods in category A, which included such items as aluminium wire, telephone and telegraph hand sets, switchboards and car batteries, these will be admitted up to 70% of the base year quota instead of 60% allowed hitherto. There will also be a more lenient licensing treatment of items under administrative control, covered by the third category. All alterations become operative as from April 1.

Senator O'Sullivan also referred to the formation of composite licensing "banks", in which importers could pool licensing entitlements to vary the proportion of individual items he imported under his total licence. These "banks" would continue and would in future be credited with 70% of class A base year quota, 30% of class B quota, and 70% of the third category quota. These percentages compare with 60%, 20% and 60% credited previously.

Electrical Exhibition takes Shape

PREPARATIONS for the second Electrical Engineers' Exhibition are entering their final stage. With just under four weeks to go before the opening we note that Sir John Hacking has accepted the invitation to perform the initial ceremony, the feature "Illumination Way" is now under construction, and the 108 exhibitors are rapidly assembling their products for display. Many new devices and types of equipment will be making their debut at Earls Court on March 25, we understand.

An early list of the wide range of products to be shown is most impressive. The large variety of goods making particular references virtually impossible. Floodlighting equipment for the Coronation, and flasher gear for pedestrian crossings will no doubt be popular, models of 275 kV grid system and equipment for future development to 380 kV will also be featured.

No More Copper Allocations

IT has been reported from Washington that the International Materials Conference is to discontinue its allocation of copper. It is stated that the need for further international allocations no longer exists but the appropriate Committee is to review the position again next month. Thus the restoration of a free market in copper comes a step nearer and, although this latest decision does not by any means indicate a return to free trading, it at least gives added significance to rumours to that effect, current a month or two ago. This latest step certainly means that the copper supply position has greatly improved.

RAISE STEEL PRICES!

IRON and Steel Corporation have asked the Minister of Supply to authorise an immediate increase in iron and steel prices to counter additional costs resulting from the rise of coal prices. The higher price of coal will raise the average cost of producing steel by some 1% or 1½%, and the Corporation maintains that the industry should not be asked to bear the whole of the burden.

The First Half-Century

Whether it can be quite safe to leave the whole lighting, power supply, and means of communication in a large city dependent on the integrity of an overhead electric power transmission has, it may be supposed, been a subject of grave consideration among engineers and others. Obviously to keep the posts standing and the insulators unbroken is a matter for which the engineer feels he can answer, but when the news came across the Atlantic that the Niagara power transmission had been struck by lightning and everything stopped at Buffalo, Lockport, and elsewhere on the line, this seemed to point to a danger of which all that can be said is that hitherto it had proved most troublesome in some cases, but never really formidable.—*From our issue of February* 26, 1903.

An Appeal to Fan Manufacturers

AN appeal for wider support, from appropriate businesses, for the Fan Manufacturers' Association Ltd. was made last week by Mr. Geoffrey Woods, secretary-treasurer of the Association. He said that there were 79 firms who might become members, but only six firms were co-operating at present, and he dwelt upon the need for a trade association able to speak authoritatively for this small but important industry.

Mr. Woods was speaking at a conference held to introduce a new F.M.A. code on fan performance tests. This has been produced to replace B.S. 848, which was prepared in 1939, and is considered by many to be out of date. The present code is designed to cover performance and efficiency of fans, and it sets out methods of test with a view to providing a basis of comparison of the relative performance and efficiency of particular types. In the code, much of the structure of B.S. 848 is retained, but the code attempts to be more precise and more comprehensive in its presentation of test data, and new test methods have been introduced in place of those originally proposed.

It is hoped that this code will form the basis for an official revision of B.S. 848. Copies may be obtained from the Association at Copthall House, Copthall Avenue, London E.C.2, price 10s post free.

Electricity's Cheerful Future

PROPOSING the Association, at the annual luncheon of the Electrical Trades' Commercial Travellers' Association last Friday, Mr. V. W. Dale (E.D.A.) declared that if there had been no war half the housewives in this country would now be using electricity for all their domestic work. He felt that, electrically speaking, saturation was further away today than it was 45 years ago. In reply, Mr. A. E. Iliffe, president, thanked Mr. Dale for filling the breach left by Sir Ernest Cooper's sudden indisposition. He continued by stressing the need, from the sales side of the industry, to pervade the selling atmosphere with cheerfulness, despite poor conditions existing at present. Mr. D. G. E. Barrie proposed the Guests, replied to by Mr. E. Mead, Metrovick Engineering Division, and Mr. A. Watson proposed the Chairman.

Industrial Inspection

IN their report "Inspection in Industry," the British Productivity Team which visited America last year to study this subject describe equipment for automatic grading and testing in current use in that country. An example of this technique is the method used to eliminate faults in wire springs due to metal imperfections. With this equipment, the wire is magnetised continuously before being made up into springs.

In another example of automatic grading in American industry, a machine automatically tests capacitors, ejecting them into graded channels according to capacitance.

Multi-gauging equipment of a type similar to that used in this country was also observed, embodying electrical contacts operating coloured signal lamps. These indicate whether the specimen is of the correct size, 10 dimensions being measured in one test.

Cookers for Bombers

SMALL containers for cooking or heating food have been produced by the G.E.C. for use particularly in aircraft. Fitted to the bulkhead they occupy no more than 8 in. by 5 in. in space, and consume about 75 W when heating contents from 58° F to 202° F in two hours. Quantities have been ordered by R.A.F. Bomber Command. Briefly the heater comprises an outer and inner container of spun aluminium, the latter, holding nearly 1½ pints, fits into the outside unit so that it is in close contact with the element. This has been insulated from the outer casing by fibre glass.

Fire Officer says All-night Grates can be Dangerous

THAT the present increase in the number of hearth fires was due to the installation of the new all-night slow-burning grate, was the opinion expressed by Chief Fire Officer, E. H. Harmer in a report to Blackpool's Fire Brigade Committee last week. His brigade had been called to houses 12 times in the last four months where all-night grates had been fitted. The fire, he said, was closer to the hearth and there was continuity of heat, resulting in ignition of hearth timbers. Thousands of the fires were dangerous, and fires were more likely to occur in houses built before 1930. A local distributor of slow-burning grates commented afterwards that the appliances could be dangerous if installed incorrectly. In his experience the hearth fires had occurred almost exclusively in upstairs flats of converted houses. Distributors, he added, often rejected orders where hearths were unsuitable.

Sulphur Control Eased

AS from last Monday, controls on the supply and use of sulphur have been revoked, except for the manufacture of sulphuric acid. Announcing this last week, the Ministry of Materials stated that increased production and effective economies in use had enabled the step to be taken, although controls as regards sulphuric acid had been retained because other materials could not be used. Supplies were not unlimited, but provided economies continued there was sufficient to meet the country's needs.

Stand at Ideal Home

IN the advertisement appearing on page 16 of this issue, the English Electric Co.'s stand number at the forthcoming Ideal Home Exhibition is given as 42. This number has now been changed to 245.

Good TV Business in Yorks and Lancs

TABLES of figures prepared and issued recently by the R.T.R.A. give an admirable indication of the comparative sales of radio and television sets sold in the areas covered by the various television transmitters. Additional figures for radio sales show demand in districts not served by television. The statistics reveal two surprises. In the first place, despite some unemployment in Lancashire and Yorkshire, those counties represented the strongest demand for TV sets during 1952. The average number of 156·81 sold per shop in that area compares with the 92·7 sets sold in the Midlands, the next best. The second remarkable fact disclosed was that sales in the areas served by Wenvoe and Kirk O'Shotts, opened for the first time in 1952, lagged behind other districts comparatively.

Rebuilding Burnt Factory

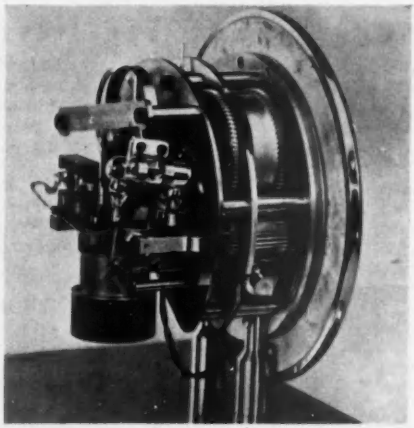
ALTHOUGH it was only last month that the Hirwaun factory of Ferguson Radio Corporation was severely damaged by fire, plans are already in hand for reconstruction. Meanwhile, production has been transferred to Spennymoor as it was found impossible to make temporary arrangements to keep production going at Hirwaun.

OFFICIAL PUBLICATIONS

INSPECTION IN INDUSTRY. Report of British Productivity Council, H.M.S.O. 3s. (*See page* 411).

BRITISH STANDARDS
B.S. 1432: Copper for electric purposes. Sheet and strip. (Revised edition.) B.S. 1915: Projectors for film strip and miniature lantern slides (for educational use) and optical lanterns; B.S. 1944: Woven asbestos tape for electrical insulating purposes; B.S. 799: 6·7 Burning Equipment (Revision); B.S.G. 141: Flexibly Mounted Instrument Panels for Fixed Wing Aircraft; and B.S.G. 143: D.C. Linear and Rotary Actuators for Aircraft.

OVERSEAS ECONOMIC SURVEY
Mexico. H.M.S.O. 3s. 6d. (*See page* 414)



Rear view of a new photo-electric clock which keeps itself wound by exposure to light. Light energy absorbed through three small apertures in the base —photo-electric cells—is transformed into electric current. This runs a tiny permanent-magnet type motor which in turn winds the mainspring. Current is automatically cut off when the mainspring is fully wound

Lighting the Mall on Coronation Day

THE Minister of Works called his second large Press Conference last week, for the purpose of reporting on arrangements being made for the Coronation. Details of the many decorative features along the processional route have yet to be worked out. Among those details are flood- and other lighting arrangements, which we understand should be disclosed in about a month's time.

Decorations along the Mall formed the subject of one of the many models shown at the Conference, and a feature of those will be the four tubular-steel arches standing some 65 ft high. The twin spans of each arch will intersect at right angles. On top will be two lions and two unicorns, 20 ft in height. A Princess's coronet is to be suspended on gold wires which will be threaded with polished aluminium spheres. Two floodlights will illuminate the rampant animals, other lamps will be placed near the foot of each span, and the coronet will be lit by about eight lamps. Standards, hung with banners, are to be placed at intervals along the kerb and four lamps will be fixed at the foot of the banners, with two at the top illuminating a crown. The nature and size of the lamps to be used has still to be decided, along with lighting arrangements over the remainder of the route.

Electricity on Farms

AT a time when there is considerable anxiety over the progress being made in rural electrification, it is encouraging to find that Electricity Boards are conversant with the situation and realise its importance. Such encouragement may be found in a publication, "Electricity for the Farmer," recently produced by the Merseyside and N. Wales Board. Anxious that farmers should make the best and most economical use of electricity, the Board has aimed at describing, in the 44-page booklet, the main agricultural uses of power under ten headings. Lighting, dairy, horticulture, poultry, are some of the farming divisions dealt with.

Mixed Initials

When "Meteor" noted in our issue of February 12 some facts about the United Nations Economic and Social Council, he used the apparently appropriate contraction "Unesco." This title is, of course, more commonly associated with the United Nations Educational, Scientific and Cultural Organisation, a body which has no economic commission for Europe. We apologise to any readers who were misled by this abbreviation.

Good Recovery from Flood Disaster

THE picture of flood damage in East Anglia nears completion as detailed information of the extent of the damage becomes available. This week we received from the Eastern Electricity Board a statistical account of the position which shows that, of 46,863 premises to which supply had been interrupted, there are 38,463 in which consumers are taking either a complete or a partial supply. Supply has not yet been restored to the consumer's service termination in 2,436 cases, although requested, and in 3,365 premises installations have to be made good before supply can be provided. A balance of 5,325 premises remains to which supply will not be restored immediately.

Approximately half of the latter premises are located in Canvey Island, in which the inundation was particularly severe, but elsewhere in the Essex sub-area conditions are almost back to normal. At Lowestoft, in the Norfolk sub-area, 17,000 consumers were affected, but supply was restored to all but 1,000 of these premises within two hours of flooding, and only 20 are now without supply.

New Trunking System for Large Office

A NEW combined fluorescent lighting and cable trunking system in which power, telephone, lighting and other electrical services can be grouped in a single steel duct, has been introduced recently by Thorn Electrical Industries Ltd. One of the first applications of this trunking was in the main offices of Joseph Watson and Sons Ltd., Leeds. Five runs of trunking, supported from the girders by short straps and clamps, accommodated lighting units, each housing two 5 ft 80 W double-life tubes behind metal louvres. In this particular instance no use has been made of the alternative channels. The installation was carried out by Green and Smith Ltd.

This attractive carton holds a string of twelve 20 V red, white and blue decoration lamps for Coronation celebrations, marketed by Thorn Electrical Industries, Ltd. The lamps are almost identical with the usual Christmas-tree lights. Similar packs of decorative lights made by the General Electric Co. and the British Thomson-Houston Co. are also on the market

E.I.B.A. Socials

MARCH 6 has been fixed by the N. Staffs branch of E.I.B.A. for their annual ball in aid of Association funds. It will take place at the Grand Hotel, Hanley. Tickets are available from Mr. C. T. Whittaker, c/o Midlands Electricity Board, 31 Kingsway, Stoke. The Berks, Bucks and Oxon branch are to hold their fourth annual ball at the Olympic Ballroom, Reading, on March 27. Tickets at 7s. 6d. and 12s. 6d., from Mr. L. H. Waters, c/o the Southern Board, Market Place, Reading.

CORROSION TESTING

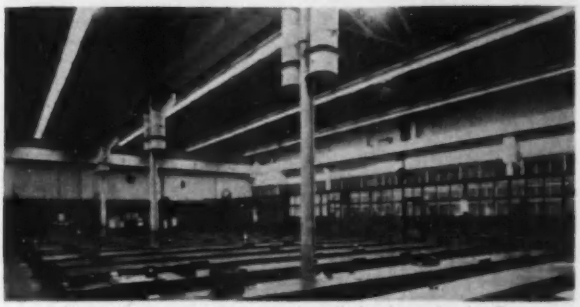
A SPECIAL course of six lectures on "Corrosion Testing" is to begin at Northampton Polytechnic, London, on March 18. Succeeding talks will be given each week on Tuesday evenings and will deal methodically with the mechanism of corrosion and methods of testing metals for corrosion resistance. Fee for the course is 20s. Full details are available from the Polytechnic's Department of Applied Chemistry, St. John St., E.C.1.

Deformation of Metals

A SHORT Summer School followed by a conference on "The Theory of the Plastic Deformation of Metals" is to be held in Bristol between July 13 and 16. It is being arranged by the Department of Adult Education at Bristol University and the Institute of Physics. Further particulars may be had from the Institute's Secretary at 45 Belgrave Sq., S.W.1. Fee for the two-day course is 30s.—there is no fee for the conference.

Apprentices' Night

THE second annual Apprentices' Night of Johnson and Phillips Ltd. took place at Woolwich recently, when the most important event was the presentation of awards to the most outstanding students of the past year. Among those rewarded were Mr. R. H. Ansell, the best junior trade apprentice, and Sub-Lt. G. L. Varley, the best engineering apprentice.



Thorn's new trunking system installed in large Leeds office

ELECTRICAL EXPANSION IN MEXICO

THERE is a good deal of electrical interest in the Economic Survey of Mexico, just published by H.M.S.O. This applies equally, both to the generation and the consumer goods field of industry, for both of which there are good prospects for U.K. manufacturers who have the initiative to overcome the difficulties involved. Probably the most significant problem is Mexico's close proximity to the U.S. Consumption of electric power is increasing rapidly in industrial, commercial and domestic spheres, with the familiar situation of demand tending to outgrow supply. To meet this, a nation-wide electrification project is being carried out and large plants are under construction which are gradually coming into operation. The major part of imports consists of machinery, components and replacements, but in recent years American capital and management have played a large part in developing industries such as engineering and electrical goods. British firms have a considerable foothold in the capital goods market and we supply such items as generators, switchgear, cables and the like. Contracts are, however, difficult to get without plenty of local knowledge and energy because public tenders are rarely called and notice is invariably short.

Turning to the possibilities as regards consumer goods, import restrictions have enabled this Mexican industry to develop remarkably. Production of refrigerators and washing machines has increased, many of the components being imported. Irons, cookers, and radio sets are assembled in Mexico and such items as electric motors, transformers, switchgear and lamps are manufactured. Tariffs give ample protection against the import of finished articles. Local assembly, therefore, appears essential.

History of B.E.A.M.A. Over 50 Years

THE development, constitution and present-day activities of B.E.A.M.A. which formed the subject matter of the opening pages of the second and latest edition of the B.E.A.M.A. Catalogue, has been reprinted in the form of a 48-page booklet. This year marks the fiftieth anniversary of the Association, and it is in commemoration of that event that the booklet has been published. In addition to the historical review, a full list of members, as at last July, has been included, as well as details of membership of the various sections of the Association.

NEWS IN BRIEF

Twenty countries will be exhibiting at this year's Lyons Fair (April 11 to 20) compared with 14 in 1952. Britain will be represented by some 30 manufacturers.

New radio telephone link beween Turkey, Western Europe and U.S., was opened to public service on February 16. The System was designed and equipment supplied and installed by Standard Telephones and Cables Ltd.

Programme of the course of lectures on "The Application of Electronics in Industry," to be held on May 4 and 5 during the Liege International Fair, has been issued by L'Institut Electrotechnique Montefiore.

South-western area winner of E.D.A.'s Public Speaking competition was Mr. S. G. Martyn, of the Electricity Board's St. Austell centre.

Kettering has won the E. Midland eliminating round of the B.E.A.'s first-aid competition. Newton Abbot won similar distinction in the S.-Western area. First aid team from Barton generating station have won the Western District contest of the British Electricity Ambulance Centre Competition. They now go forward to the finals which will take place in London next month.

Telcon Staff Association held their fifth annual dinner and dance at the Dorchester recently.

The 1953 National Poultry Show will be held at Olympia, London, on December 10, 11 and 12.

Temporary low-power T.V. transmitters to be installed at Pontop Pike and Belfast will use the asymmetric sideband system and not the double sideband system, as previously announced by the B.B.C.

Youngsters inspecting day-old chicks in the observation incubator displayed at a small exhibition of agricultural equipment at the Bower Ashton service centre of the South Western Electricity Board's Bristol South district. Incubator was made by Curfew Appliances Ltd.

Questions in Parliament . . .

TV in Cornwall

Giving brief details of plans for television in parts of Cornwall, Mr. Gammans stated that the B.B.C. proposed to erect a transmission station near Plymouth. As to the extent of coverage, he was unable to give an answer at present—a site at North Hessary Tor had been considered—but an alternative was now being tested to estimate its approximate coverage.

Trade Mission to Caribbean

Some of the conclusions of the U.K. Trade Mission to Venezuela, Colombia, Dominica, Cuba and Mexico, were mentioned by Mr. P. Thorneycroft in a written answer last week. He said it appeared there was no reason why U.K. experts should not win an increased and enduring share in the countries' trade, especially as there was a genuine interest in, and a willingness to buy British goods. The development of natural resources and construction of public works presented excellent openings for the U.K. engineering industry, the Mission had reported. The party had also concluded that exports of consumer goods could be increased if regular visits were made, prices were kept competitive and on-the-spot agents or representatives were appointed. The Minister said he expected to receive the Mission's report shortly.

See also *Economic Survey of Mexico* on page 414.

Purchase Tax

The suggestion that purchase tax being levied on fluorescent lighting equipment should be reduced, was under consideration, the Chancellor of the Exchequer told the House last week. He added that he could not anticipate the budget.

Spares to Brazil

Questioned by Mr. J. Rodgers on the extent to which the Export Guarantees Act covered the export of spare parts to Brazil, the President of the Board of Trade said there was a special case for facilitating the supply of spare parts for British machinery which was already in use and had to be maintained. Export credits cover on short-term business with Brazil was withdrawn last May. Mr. Thorneycroft said the E.C.G. Dept. would, therefore, provide as an exceptional measure, a special and limited form of cover for the export of spare parts to Brazil, but it was an exceptional measure to deal with a special case. The general problem of U.K. trade with Brazil was still being considered.

New Power Stations

Figures showing the increased output of electricity during post-war years and the number of power stations completed were published in *Hansard* last week in reply to a question. The Minister of Fuel and Power pointed out that the two items were not compatible and that many stations were completed in stages over a number of years. The following was the information given:

	MW sent out	Stations reaching ultimate capacity
1945	181	2
1946	307	1
1947	340	3
1948	566	4
1949	703	4
1950	965	6
1951	1,113	2
1952	1,539	3

Modernising S. Wales Industry

Names of the 13 members of the committee which is to advise the Government on the industrial modernisation of the west of South Wales, were announced by Sir David Maxwell Fyfe last Friday. Included in the list were Mr. W. F. Martin Hurst of Teddington Controls, Ltd., and Sir George Briggs of Tube Investments, Ltd.

Company Activities . . .

Bakelite Ltd.

Further evidence of the recession which has affected much of the plastics industry is shown in the results of this company for 1952. The preliminary statement records a group profit of £562,660, which is £124,471 lower than for the previous year. After charging taxation, etc., the profit available for appropriation is £241,360 (*£320,341*). The distribution is the same as before, the final dividend of 9½% making a total of 12½% for the year on the Ordinary capital which has been increased by a 100% scrip bonus. Last year the total was 25%.

Electrical & Industrial Investment

For 1952 the investment income increased by nearly £2,000 to a total of £96,701, while other income also rose by £2,007 to £2,903. After taxation the net profit becomes £44,958 (*£44,322*), and the Deferred Ordinary dividend is raised by 5% to 30%.

English Electric Co. Ltd.

The trading profit for 1952, an increase of £716,893 over the previous year's total, is another record for the company. The total, after all charges other than taxation, is £4,359,034 compared with £3,642,141 for the previous year. Taxation absorbs £2,909,516 (an extra £622,905) and the net profit becomes £1,449,518 (*£1,326,721*). The total distribution, also, is increased, for the final Ordinary dividend of 10% makes a total of 15% on the larger capital (absorbing £418,013) compared with the 20% for 1951 which absorbed £325,121.

A. H. Hunt (Capacitors) Ltd.

There is a small reduction in the profit for 1952, after all charges, including taxation. The profit figure, according to the preliminary statement, is £74,398 compared with £91,420 for the previous year, but the total dividend is maintained at 25% with a final of 17½%.

Marconi's Wireless Telegraph Co.

A substantial rise in the profit for 1952 is also recorded in the preliminary statement of this subsidiary of the English Electric Co. After all charges, other than taxation, the profit is £576,704 compared with £331,381 for the previous year. But after taxation the figure is reduced to £192,177 as against £159,667 for 1951. The Ordinary dividend is again 7%.

Marconi International Marine Communication Co.

For 1952 the profit after all charges, other than taxation, is £337,093, a reduction of £24,183 over the previous year's figure. The net profit is £77,093 (*£138,276*), and there is a final dividend of 6% again making a total of 10%.

Mather & Platt Ltd.

With a final Ordinary dividend of 6%, the total is again 10% for the year, but the bonus has been increased to 5% (2½%). After charging stock-in-trade contingency and taxation the consolidated profit for the year is £428,790, and increase of £95,477.

National Plastics

Unlike some other plastic concerns, this company reports an increase of nearly £50,000 in its trading profit for the year ended September 27 last. The total is £452,690 (*£406,331*) but after all charges, including taxation of £254,085 (*£162,967*), the net profit is £122,379 (*£190,532*). The dividend is again 5%.

Negretti & Zambra

The group trading profit for the year to September 30 last amounts to £216,726 compared with £208,917 for the previous period. After taxation, etc., the net surplus is £86,897 (*£81,422*) and the Ordinary dividend is again 22½%.

Radio Rentals Ltd.

An offer of 83,250 Ordinary shares of 5s. each to Ordinary shareholders at a price of 12s. per share, on the basis of one for every ten held, is being made by the directors.

Ransomes & Rapier

An increase in the authorised capital to £700,000 by the creation of 200,000 10s. shares of which 112,000 will be Ordinary and the remainder unspecified is proposed by the directors.

J. Stone & Co. (Holdings) Ltd.

Permission of the Capital Issues Committee is being sought to a new rights issue. This will consist of 171,543 "A" shares which are non-voting, and their price and the date of the offer will be made known later.

Taylor Tunnicliffe (Electrical Industries) Ltd.

Although there is a small reduction in profit for 1952 the dividend has been raised by 5% to 25% for the year, according to the preliminary statement. Our accompanying table reflects the steady expansion of the business in recent years, and we judge that restrictions on exports to a number of countries is the cause of the small drop in profit for the past year, for apart from insulators and such equipment, the company also supplies large quantities of refractory parts to heating equipment manufacturers.

Year to Dec.31	£ Trading Profit	£ Net Profit	% on Ord. Earn'd	% on Ord. Paid	Ord. Price High	Ord. Price Low
1948	280,556	85,125	48	15	16/9	13/9
1949	322,888	123,468	71	15	16/6	12/6
1950	359,922	136,360	79	20	16/6	13/6
1951	452,783	158,970	95	20	23/-	16/7
1952	423,870	157,655	94	25	19/6	18/3

Westinghouse Brake & Signal Co.

An increase of about £500,000 in the gross trading profit for the year ended September 27 last, is a reflection of the record total of despatch sales achieved during that period. But, as Capt. A. R. S. Nutting, chairman, points out, the effect of penal taxation is to deprive the company of £720,843 of the trading profits, and, as our table shows, the increase available for allocation is not as large as might be hoped. The reserve for the replacement of plant and equipment takes yet another £105,000, making the total £600,000, and a further £50,000 is placed to the general reserve. Orders on hand at the present time remain at a high and satisfactory figure—at the end of December last 37.25% of these were export orders. Capt. Nutting considers that the current period 1952/53 should be a satisfactory one, although factors over which the company has no control, may have some effect on trading results. A proposal to increase the authorised capital from £1,500,000 to £2,500,000 is to be the subject of a special resolution at the meeting on March 13.

Year to Sept.27	£ Trading Profit	£ Net Profit†	% on Ord. Earn'd	% on Ord. Paid	Ord. Price High	Ord. Price Low
1948	*588,727	230,879	37	14	73/6	60/-
1949	623,050	184,980	30	14	71/-	60/-
1950	664,446	184,634	30	14	63/-	54/3
1951	882,339	319,622	49	14	63/-	53/-
1952	1,386,314	396,173	67	15	53/6	44/-

* 53 weeks. † Attributed to holding company.

Dividends Declared

Crabtree Electrical Industries.—Interim of 7½% (*same*).

Greengate and Irwell Rubber Co. Final Ordinary dividend of 10% plus bonus 10%, making 25% for the year on the reconstructed capital. Net profit is £288,207 (*£501,077*).

Richard Johnson, Clapham and Morris. Interim of 2½% on increased capital (*5% on smaller capital*).

Morphy-Richards, Ltd. Interim of 15% (*same*) payable on April 10.

Electric Supply News . . .

Brighton

Following discussions between the corporation Housing Committee and the South Eastern Electricity Board, the Committee has recommended that all the 1,000 houses on the north section of the New Addington housing estate should have electric immersion heaters (at a price of £11 per house, including minor extra building costs), while 25% of the new houses should also have electric cookers. This arrangement was arrived at after the Board had pointed out that the estimated current consumption might not otherwise produce the percentage return required by them to justify the capital cost incurred in cable laying, in which case they would need a guarantee from the Corporation.

Cumberland

Borrowdale Parish Council has again raised the question of obtaining an electricity supply for the area. Mr. F. Peart, the local M.P. has been requested to take up the matter and the English Lake District National Park Planning Committee is also being approached.

Douglas (I.o.M.)

The promenade is not likely to have the display of illuminations and floodlighting of boarding houses and hotels proposed to mark the Coronation season unless the corporation reduces its charges for electricity, so suggested Mr. A. Robinson, retiring president of the local Residential Hotel and Boarding House Association, recently.

Easington (Co. Durham)

The North Eastern Electricity Board is to take over the distribution network at Blackhall, Hesledon, Monk Hesledon and High Hesledon from the National Coal Board, and the system is to be changed over from d.c. to a.c. The work will take about 15 months. Wiring and equipment in houses will also be brought up to standard. The Board's programme for taking over all networks in County Durham owned by the Coal Board is to be carried out in five years, and the work has been divided into seven stages.

Eire

The Electricity Supply Board is considering dispensing with the two-part tariff system under which the fixed charge to domestic consumers is based on the poor-law valuation of the premises. Several alternative methods are under consideration, and consumers in various parts of the country are being asked to provide data in this connection.

Northern Ireland

A scheme has been prepared for the establishment of a run-of-the-river hydro-electric station on the River Bann at Carnroe, near Kilrea, Co. Derry. The scheme is now being submitted to the Northern Ireland Ministry of Commerce for approval. The idea of a hydro-electric scheme on the Bann was discussed by the Charlemont Commission appointed in 1923 to inquire into Ulster's power resources. It was estimated that a station at Carnroe would have a capacity of 10,050 kW, and at that time the cost was estimated at £580,000. The commission advised against the scheme because of the conflict of interests involved and proposals then being considered for the drainage of the Bann. The Electricity Supply Act, 1928, conferred upon the former Antrim Electricity Supply Co. authority to build a dam and weir at Carnroe, and to form a reservoir, but these works were not carried out.

North Eastern

A deputation from North-East local authorities has made unsuccessful representations to the area Electricity Consultative Council against higher street lighting charges to be brought into operation on April 1 by the North-Eastern Electricity Board. The deputation, represented about twenty local authorities, and Mr. H. Ayrey, town clerk of South Shields, prepared their case for submission. He has now been notified by Mr. W. S. Hall, chairman of the Consultative Council, stating that the local authorities' case had been carefully considered, but the Consultative Council could not support the claim for modification of the proposed terms. The proposed new charges will cost Sunderland £4,000 more per annum, South Shields £1,100 and Newcastle £1,500, while at Middlesbrough the increase will be about 20 per cent. The reasons for the increased charges are higher costs of wages, materials and coal. No further action against the terms is likely.

LIGHTING SCHEMES

Coleraine.—The local Chamber of Commerce has suggested the replacement of the present gas lighting system by electricity.

Crompton. The U.D.C. has accepted the recommendation of a sub-committee for the conversion of all street lighting from gas to electricity, spread over seven years. In 1953-4 the cost to the rate fund will be £716 in addition to loan expenditure of £2,684.

Margate.—T.C. recommended to borrow £1,021 for street lighting at Hundreds Farm site, Westgate-on-Sea.

Montrose.—T.C. has agreed to instal sodium discharge lamps at the Brechin Road housing scheme and at 8 Nursery Road.

Wellington (Somerset).—The U.D.C. has approved a scheme for sodium lighting along the Bristol-Exeter trunk road in the borough, at a cost of £2,650.

Commercial Information

CONTRACTS OPEN

HOME

Feb. 27.—Ballymoney. Electrical installation in extensions to Dalriada school. R. Robinson and Sons, Riada House, Ballymoney. Deposit £3 3s.

Feb. 27.—Basingstoke. Park Prewett Group Hospital Management Committee requires supply of electric lamps during six months beginning April 1. Group Secretary is F. Hales, Park Prewett Hospital, Basingstoke, Hants.

Feb. 28.—Chadderton U.D.C. Supply of electric lamps during the 12 months ending Mar. 31, 1954. Engineer and Surveyor, Town Hall.

Feb. 28.—Exeter. Supply of electric lamps to some 30 hospitals under Exeter and Mid-Devon, E. Devon and Exeter Special Hospital Management Committees, during year ending Mar. 31, 1954. Apply to Purchasing Office at Royal Devon and Exeter Hospital.

Feb. 28.—Irlam U.D.C. Supply of electric lamps required for year ending Mar. 31, 1954. Engineer and Surveyor, Council Offices.

Feb. 28.—Leeds. Supply of 50 side entry and one top entry totally enclosed 140 W sodium lanterns with control gear. Town Clerk, Civic Hall. (See Feb. 19 issue.)

Feb. 28.—Wexford. Supply and installation of electrically driven pumping plant and equipment for Edenvale pumping station. Consulting Engineers, Delap and Waller, 63 Lower Baggot St., Dublin. Deposit £5 5s.

Mar. 2.—Manchester. Rewiring and additions to electrical installation at Gt. Moreton Hall, Astbury. City Architect, Town Hall. Deposit £1 1s. (See Feb. 5 issue.)

Mar. 2.—N. Ireland. Electrical work in 70 flats, 9 shops and 2 offices at Sunnylands, Carrickfergus. N.I. Housing Trust, 12 Hope St., Belfast. Deposit 10s.

Mar. 2. — Omagh (Tyrone). Lighting and cooking installations in new kitchen at Tyrone and Fermanagh Hospital. J. A. D. Shortt, secretary of Hospital, Omagh. Deposit £3 3s.

Mar. 3.—Gt. Yarmouth T.C. Supply of electric cables for one year from April 1. Borough Engineer, Town Hall. (See Feb. 19 issue.)

Mar. 3.—West Riding. Electrical installation at fire services' repair depot in Balne Lane, Wakefield. County Architect, Bishopgarth, Westfield Rd., Wakefield. Deposit £2 2s.

Mar. 4.—Lancashire. Electrical installation at Leigh Hostel for the aged. County Architect, County Hall, Preston.

Mar. 4.—Manchester. Supply and erection of four centrifugal pumps with electric motors, automatic switch and control gear, etc., for Poundswick B Booster station. Secretary, Waterworks Offices, Town Hall. Deposit £1 1s.

Mar. 5.—Belfast. Electrical installation at plant pathology laboratories in Newforge Lane. Ministry of Finance (Room 103), Law Courts Building.

Mar. 6.—Southport T.C. Floodlighting of jumping ring at Flower Show on Mar. 26, 27 and 28. Details from Secretary, Southport Flower Show, Victoria Buildings, Lord Street. (See Feb. 19 issue.)

Mar. 6.—Stourbridge T.C. Supply of flood and festoon lighting equipment. Documents from Park Superintendent, Stevens Park, Wollescote, Stourbridge.

Mar. 7.—Bath. Supply of electric lamps and control gear, time switches and other equipment for street lighting. City Engineer, Guildhall.

Mar. 7.—Longbenton U.D.C. Installation of electricity in 20 houses at Forest Hall and 32 at Wideopen. A. S. Sweetman, surveyor, Council Offices, Forest Hall, Newcastle. Deposit £2 2s.

Mar. 7.—Llanelly. Installation of stage lighting equipment, emergency lighting, cables, switches, etc., at Pontyberen Memorial Hall and Institute. Applications by above date to G. Bowen, Secretary of Institute, Llanelly.

Mar. 7.—Merthyr Tydfil T.C. Certain electrical goods required during year beginning April 1. Borough Engineer and Surveyor, Town Hall.

Mar. 7.—Wexford. Supply and erection of fully equipped electrically driven centrifugal pumping plant and water treatment plant at Taghmon. T. J. O'Connor, consulting engineer, Commercial Bldgs., Dame St., Dublin. Deposit £5 5s.

Mar. 9.—Armagh. Electrical installation at Newtownhamilton intermediate and primary schools. J. R. W. Murland, consulting engineer, 13 Wellington Place, Belfast. Deposit £5 5s.

Mar. 9.—Eton R.D.C. Manufacture and installation of seven sets of electrically driven vertical unchokable sewage pumps with ancilliary equipment, for three stations in Denham drainage scheme. Consulting Engineers, John Taylor and Sons, Artillery House, Artillery Row, Westminster. Deposit £5.

Mar. 10.—Thurles U.D.C. Supply and installation of duplicate electrically driven pumping plan at Lady's Well. Nicholas O'Dwyer, Consulting Engineer, 6 Burlington Rd., Dublin. Deposit £5 5s.

Mar. 13.—Durham. Electrification of 320 council houses hitherto lit by gas. City Engineer, Town Hall. Depost £2 2s. (Advertised in this issue.)

Mar. 14.—Evesham T.C. Supply and installation of 24 140 W sodium lighting units, with auxiliary equipment and steel columns at Avonside-Waterside, A.44. Borough Surveyor, 1 Leicester Gables, High St. Deposit £2 2s. (Advertised in this issue.)

Mar. 14.—Frimley and Camberley U.D.C. Installation of electric light in 132 houses in district. Engineer and Surveyor, Municipal Buildings, Camberley. (See Feb. 12 issue.)

Mar. 14.—King's Lynn T.C. Supply of electric lamps required during year beginning April 1. Borough Engineer, H. G. Ridler, Clifton House, 17 Queen Street.

Mar. 16.—Southampton T.C. Re-wiring electrical installation at Central Boys', Girls' and Infants' School. Applications to Borough Architect, Civic Centre, by Mar. 2. Deposit £5. (Advertised in this issue.)

Mar. 17.—Londonderry. Electrical installations in 24 flats at Creggan. N. Ireland Housing Trust, 12 Hope St., Belfast. Deposit 10s.

Mar. 18.—Galway. Electrical installation at fire station at Carryglass. J. C. Costello, consulting engineer, 21 Leeson Park, Dublin. Deposit £5 5s.

Mar. 20.—Huddersfield T.C. Electrical work in filter house to be constructed at Holmbridge. Documents from Waterworks Engineer, 24 Ramsden St. Deposit £1 1s.

Mar. 24.—Ilford T.C. (*a*) supply of 158 140 W sodium lanterns, lamps, jackets and control gear, and (*b*) supply, erection, etc., of 158 concrete columns and installation of lanterns, etc. Borough Engineer and Surveyor, Town Hall. Deposit £2 2s. for each contract. (See Feb. 12 issue.)

Mar. 28.—Cork. Supply of electrically operated tidal penstock for sewerage scheme at Glanmire. E. Callanan, county secretary, Council's Offices, 7 Fr. Mathew Quay, Cork. Deposit £5.

April 10.—Belfast. Supply and erection of drainage pumping equipment including 600 g.p.m. pumps, motors, pipes, valves, lighting tackle, etc., for Victoria power station. Merz and McLellan, consulting engineers, Carliol House, Newcastle-on-Tyne. Deposit £5 5s. (Advertised in this issue.)

No date stated.—Barrhead T.C. Electrical work in erection of 20 houses in Auburn Drive and 8 in Bellfield Crescent. William Baillie and Son, architects, 4 West Regent St., Glasgow.

No date stated.—Dalkeith. Electrical work in conversion of police barracks to sub-divisional headquarters. County Architect of Midlothian, 32 Palmerston Place, Edinburgh.

No date stated. — Haddington T.C. Electrical installation in 39 houses on Roodlands site. John A. W. Grant, chart. arch., 36 Melville St., Edinburgh.

No date stated.—Melrose T.C. Electrical installation in development of corner of Abbey St. comprising a shop and 18 houses. Apply to F. P. Smart, Town Clerk, Melrose.

No date stated.—N. of Scotland H.E. Board. Lighting and heating installation at Linchart power station, Ross-shire. Merz and McLellan, consulting engineers, 39 Northumberland St., Edinburgh. Deposit £2 2s.

OVERSEAS

Details of items marked • may be obtained on application to the Board of Trade, Horseguards Avenue, S.W.1, quoting reference.

Mar. 10.—Pakistan. Supply of three transformers to various specifications with h.t. and l.t. switchgears and control feeder panels, and spares. Director General, Supply and Development, Frere Rd., Karachi. B.o.T. (Ref. CRE 7116/53).•

Mar. 17.—Pakistan. Supply of eight lighting sets—three-cylinder enclosed diesel engine, developing 21·3 b.h.p. with accessories, alternator, switchboard, etc. Director General of Supply and Development, Frere Rd., Karachi. B.o.T. (Ref. CRE 6217/53).•

Mar. 20.—India. Supply of 44,000 solid-drawn steel tubes for boilers of various sizes. Also 11,500 cupro nickel tubes for condensers. Director-General, India Store Dept., 32-44 Edgware Rd., W.2. Fee in each case, 10s. Separate contracts. Quote refs. 3464/52 and 4746/52 respectively.

Mar. 25.—S. Rhodesia. Supply of 159 rural and distribution type transformers, up to and including 500 kVA, and spares. Electricity Supply Commission, P.O. Box 377, Salisbury. B.o.T. (Ref: CRE 4269/53).•

Mar. 27.—Uruguay. Usinas Electricas y los Telefonos del Estado, require supply of 11 outdoor and one indoor transformers with spares equipment. U.T.E. is at Paraguay 2431, 8 piso, Montevideo. B.o.T. (Ref. CRE 6744/53).•

April 8.—New Zealand. Supply of 1,500 two-conductor switchboard cords to various specifications for Post and Telegraph, G.P.O., Wellington. Bo.T. (Ref. CRE 6371/53).•

April 8.—New Zealand. Supply of 500 condensers, paper, tubular, miniature, metal cased, nom. cap. 0.1. mfd, 500 V, not greater than 2¼ in. by ¼ in. Director General (Stores Div.), G.P.O., Wellington.

CONTRACTS PLACED

Cardiff. Installation of stage lighting at Sophia Gardians Pavilion, Thorn Electrical Industries Ltd., £2,264.

Grimsby T.C. Electrical installation in second phase of workshop block of College of Further Education, H. Carr, Ltd., £3,047.

Swansea T.C. Electrical work in 116 houses on Clase site, Clarke Bros. (Stroud), Ltd., £2,972.

Macclesfield T.C. Supply and erection of 113 class A sodium lighting units and concrete columns along three roads, Revo Electric Co. Ltd., £6,267.

St. Pancras B.C. Electrical work on Torriano Ave. housing scheme, Thomas H. Smerdon Ltd., £4,760.

Your Queries — Answered

"Magnetophone" recording tape, makers of? F.A.—Minnesota Mining and Mfg. Co., Ltd., Arden Rd., Adderley Park, Birmingham 8. (25064)

"A.E.E." frequency transformers, makers of? D.E.—Associated Electronic Engineers, Ltd., Dalston Gardens, Stanmore, Middx. (25076)

Cable length measuring machine, makers of? F.M.—B. and F. Carter and Co., Ltd., Albion Works, Bolton. (25089)

"Kenmore" vacuum cleaners, suppliers of? S.W.—Sears, Roebuck and Co., Ltd., 45 Wigmore St., London W.1. (25097)

"Propelair" fans, makers of? T.E.—Veritys, Ltd., Brettenham House, Lancaster Place, W.C.2. (25106)

"Meracol" fires, makers of? T.N.—These were made by the Thermopath Co., a firm which went out of business around 1934. (25112)

Electric de-horning devices for cattle, makers of? T.B.—Cooper-Stewart Eng. Co., Ltd., Avenue Chambers, Vernon Place, London W.C.1. (25116)

The above are selected from questions we have answered this week. If you have a query, send it to us.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 113 Chancery Lane, London W.C.2.

A.D.S. Relays Ltd. Manufacturers of and dealers in electrical, wireless and television goods, etc. Cap.: £1,000. Dirs.: not named. Subs.: J. Lewin and E. Walton, 12a Maddox St., W.1.

A.R.B.E. Ltd., 16 Manchester Sq., W.1. Manufacturers of and dealers in electrical apparatus and equipment, radio and television apparatus, etc. Cap.: £100. Dirs.: L. S. Race and Rita M. Race and H. M. Horton.

Gloster Glass Ltd. Manufacturers of and dealers in glass and glass tubing for use in connection with tubular or strip or other lighting, etc. Cap.: £100. Dirs.: P. H. Dixon and Julia B. Dixon.

Hill Electrics Ltd., 7 Windmill Parade, Ruislip, Middlesex. Designers, manufacturers, importers and exporters of and dealers in electrical and electronic apparatus and supplies, etc. Cap.: £500. Dirs.: H. L. Hill, and P. B. W. Crichton.

Mortron Co. Ltd., 12 Park Place, St. James's, S.W.1. Manufacturers of and dealers in domestic, household, plastic mouldings and general electrical and other equipment and appliances, including vaporisers, etc. Cap.: £100. Dirs.: H. F. D. Dobson, I. G. Wootton and F. W. W. Wootton.

Overseas Electrical Installations Ltd. Electricians, electrical engineers, etc. Cap.: £10,000. Dirs.: to be appointed by subs. Subs.: R. H. Smallman, Martham, The Close, Kingswood, Surrey and J. A. Grant, 19 King Edwards Grove, Teddington, Middlesex.

Process Units (Halifax) Ltd., Manufacturers of and dealers in process controls and control gear of all kinds, electric timers, counters, etc. Cap.: £2,000. Dirs.: not named. Subs.: Annie Horner, 27 Cowman Terrace, Hanson Lane, Halifax; and H. Wilson, 112 Rochdale Rd., Triangle, near Halifax.

Thermal Efficiency Ltd., 32 Victoria St., Westminster, S.W.1. Designers, sellers, constructors, equippers and maintainers of equipment for the conservation of heat, industrial heating and ventilation and fuel economisers, etc. Cap.: £1,000. Dirs.: J. M. Dent and B. M. Dent.

PRICE OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	285 0 0	—
LEAD, good soft pig (foreign)	93½-93¾	108 0 0
" " "English" quality ...	94½-95	
TIN (99·99·76%) ... ... (Cash)	957-958	—
" (3 months)	937-938	—
ALUMINIUM, commercial purity (del.)	166 0 0	—
ZINC	80¾-81¼	92 0 0
ARMOURING:		
Galv. Steel Wire (0·104 in.) ...	51 10 0	—
Mild Steel Tape (0·04 in.)	39 15 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Banting and Tresilian, Ltd. At meeting on Feb. 13, resolution was passed for voluntary wind-up. Leonard S. Grigg, of 54 Cornhill, E.C.3, was appointed liquidator and creditors are asked to send particulars to him by Mar. 20.

Bloor Industries, Ltd. Ronald F. Bendall, of 31 Lloyd St., Manchester, has been appointed liquidator, with a committee of inspection.

Electricity House Ltd. Resolution for voluntary winding-up passed at meeting on Feb. 13, when E. Van Ham, The Oval, Tranmere Park, Guiseley, Leeds, was appointed liquidator.

M. P. Stainless Products Ltd., and **Peco Engineering Products Ltd.** Petition presented and directed to be heard at Royal Courts of Justice, London, on Mar. 2. Interested persons should communicate with R. B. Waterer, solicitor of Inland Revenue, Somerset House, Strand, W.C.2.

Renas Engineering Co. Ltd. Meeting of creditors is to take place at 107 Albert Rd., S.E.25, on Mar. 5, at 11 a.m.

W. J. M. Holdings Ltd. Torquil John Murdock Macleod, of 4 Bucklersbury, E.C.4, has been appointed liquidator with committee of inspection.

Wilsons (Radio and Electrical), Ltd. Meeting of creditors has been arranged at Incorp. Accountants Hall, 90 Deansgate, Manchester, at 2.30 p.m. on Mar. 4.

Partnerships Dissolved

Holmes and Lucas, radio and electrical dealers, of 14 Regent St., Swindon. Partnership between Frederick E. Holmes and Albert G. Lucas dissolved as from Feb. 11. Debts received and paid by F. E. Holmes who will continue business.

Fylde Electrical Co. Partnership between Gilbert Meal, Fred Doyle and John Crowther, electrical contractors at 2 Fleetwood Rd., Carleton, nr. Blackpool, dissolved as from Feb. 14. Debts. received and paid and business continued by G. Meal and J. Crowther.

BANKRUPTCY ACTS

First Meeting

Birmingham. Henry Tansey, electrical contractor of 53 Hollydale Rd., Erdington. Meeting will be at Somerset House, Temple St., Birmingham, on Mar. 2, at 11.15 a.m., and public examination at the Court House, Corporation St., on April 15, at 10.15 a.m.

Receiving Order

Portsmouth. Thomas R. Hugo, electrical engineer trading as Victor Hugo's at 51 Fawcett Rd. Southsea. Date of receiving order, Feb. 12.

Public Examination

Birmingham. Wilfred J. Layton, trading as electrical engineer at 102 Evesham St., Redditch. Examination will take place at The Court House, Corporation St., Birmingham, on April 1 at 10.15 a.m. First meeting took place yesterday (Wed.)

Order on Application for Discharge

London. Ronald A. Squires, engineer and dealer in radio and electrical goods trading as Radiotois at 21 Station Rd., Brixton. Order dated Jan. 20. Bankrupt's discharge suspended for nine months and that he be discharged as from Oct. 20.

Intended Dividends

Barrow-in-Furness. Samuel G. Penrith, electrical contractor trading at 5 and 14 Mount Pleasant, Barrow. Last day for receiving proofs, Mar. 7. Trustee is D. Atkinson, 14 Lowther St., Carlisle.

BUSINESS PROSPECTS

HOME

Atherstone (War) R.D.C. Erection of 116 houses at Baddesley Ensor. H. N. Jepson, Architect, Midland Bank Chambers, Nuneaton.

Banstead (Surrey). Starting dates fixed for 532 houses (May), 150 flats (July), and six shops (Sept.). Clifford Culpin and Partners of 3 Southampton Place, W.C.1, are Architects.

Blaby (Liec) R.D.C. Erection of 22 and 16 houses at Enderby. F. W. James, Architect, Council Offices, Narborough, Leicester.

Brecon T.C. Erection of 40 houses at Pendre. Council's Architect, G. H. Griffiths, 67 Queen St., Cardiff.

Carfin. Scottish Industrial Estates Ltd., 3 Woodside Crescent, Glasgow, are to build factory blocks two and three on industrial estates.

Castle Ward (Northumb.) R.D.C. Plans prepared for erection of 146 houses at Dinnington Colliery.

Crosby (Lancs) T.C. Construction of 66 houses and 12 flats on Brownmoor Lane Estate. T. W. Crookdale, Borough Engineer and Surveyor, Town Hall, Waterloo, Liverpool.

Dartford (Kent) R.D.C. Layout plans approved for 46 houses and 12 flats on St. James' Lane estate, Stone.

Dublin. Erection of 202 houses at Ballyfermot area. Housing Architect, 6 Mountjoy Square.

Durham. Electrical installation is to be renewed at Leamside county school and at Shildon library and school clinic.

Gainsborough U.D.C. Plans approved for proposed new Town Hall.

Hampstead B.C. Erection of housing scheme in Broadhurst Gardens comprising, 96 maisonettes and 12 flats. P. H. Harold. Town Clerk, Town Hall, Haverstock Hill, N.W.3.

Hemel Hempstead. Plans in hand for construction of secondary school at Bennetts End, estimated to cost £212,400.

Ilford T.C. Approval sought for erection of further 72 flats on Marks Gate estate.

Kensington. Architects for £92,611 Bonsfield primary school are Chamberlain Powell and Son, 15 Sydney Mews, Fulham Rd., S.W.3.

Leicester. Pumping station at Cropston is to be electrified and modernised. H. Wallhouse is water engineer.

Lewisham. Scheme submitted for building of 59 flats, 20 houses and other buildings on Eliot Vale site. Estimated cost, £209,400.

London. Plans approved for six-storey extension to St. Bartholomew's Hospital.

Scunthorpe T.C. Approval given for erection of 100 houses and 28 flats on New Brumby Estate, 57 flats on Lincoln Gardens Estate, 36 flats in Bushfield Rd., Queensway, and 348 houses on Church Farm Estate. Further stage in building of new Technical College is being considered by County Council.

South Shields T.C. Construction of 56 houses in Crawford St. Borough Engineer, Town Hall.

St. Ives (Hunts) T.C. Work to start soon on erection of further 58 houses.

Stepney. It is proposed to build 51 flats and 32 maisonettes etc. on Dorian St. site at estimated cost of £180,500.

Stourport U.D.C. Erection of 72 dwellings in Walshes Farm scheme No. 8. L. H. Poole, Surveyor, The Council House, New Street.

Surbiton. Plans submitted by Matthews and Son for factory in Cox Lane and Davis Road.

Swansea. Glovtex Ltd. have submitted plans for factory additions at their Argyle works.

Tunbridge Wells T.C. Construction of 108 dwellings on Sherwood estate. H. P. Bishop, Borough Surveyor, Town Hall.

Walthamstow. Duroglass Ltd. propose works extensions costing £33,000 at their premises in Blackhorse Lane.

Whitehaven. Factory additions proposed by Marchon Products Ltd.

Wallsend T.C. Loan sanction received for 36 flats on Oak Grove site. Also tenders to be invited for erection of 160 houses on Churchill St. site.

Whittlesey U.D.C. Construction of 62 houses in Victory Ave. and Drybread Rd. Ruddle and Wilkinson, Architects, Long Causeway Chambers, Peterborough.

Windermere U.D.C. Application to be made for sanction to borrow £300,000 for erection of 180 houses and 25 flats on Droomer Stile estate.

Worsbro' (Yorks) U.D.C. It is proposed to build 72 houses on the Whitecross site at cost of £96,041.

OVERSEAS

Canada. Electronic Materials International Ltd., 131A Bank St., Ottawa, are interested in representing U.K. manufacturers of high-precision measuring equipment, electronic equipment related to radar and communications, etc. Write direct to general manager, Mr. Ingram.

U.S.A. Mr. E. R. Samsey of E. R. Samsey and Co., P.O. Box 5, Station I, Toledo 14, Ohio, is enquiring as regards the importation of torch batteries, portable power driven saws and wood-carving tools.

India. Dr. Prasad of Duduwala and Co., 177A Chittaranhan Ave., Calcutta, is in a position to offer supplies of mica to users, and wishes to negotiate with U.K. manufacturers of mica and micanite products for establishment of factory in India under joint ownership. Dr. Prasad may be contacted at 54 Lanerscroft Rd., London S.W.2.

The Lebanon. Agencies of U.K. manufacturers of domestic electrical goods and electrical accessories (switches, plugs, cables etc.) sought by Raymond A. Khonkaz, Imm. Essaili, Place Assour, P.o.B., 2 to 6, Beirut.

TRADE NOTES

Greek Import Levy. Under recent decrees a levy is now placed on certain imports into Greece. For lamps and lighting equipment the tax is 100%, while for electric appliances the percentage varies between 50% and 150%.

Representative. Mr. B. Tolhurst of 36 Swiss Drive, Ashton Vale, Bristol 3 (tel.: Bristol 61783), has been appointed representative by T.M.C.-Harwell (Sales), Ltd., for the sale of Temco accessories and clocks in Bristol, South-West England and South Wales.

S.W. Depot. Gent and Co., Ltd., have made arrangements for a depot to be established in Bristol. The branch is under the direction of J.W. Equipment, Ltd., at 3A Berkeley Place, Clifton, Bristol, 8, telephone 25655. Its territory comprises the counties of Gloucester, Wiltshire, Dorset, Somerset, Devon and Cornwall, together with Bournemouth and Christchurch.

MEETINGS TO NOTE

THURSDAY, FEB. 26

A.S.E.E. (Luton Branch).—"Some Applications of Heat Exchange." H. E. Holt. George Hotel, 8 p.m.

E.P.E.A. (S. Western Tech. Group).—"Operation of British Grid System." L. B. Law. Elect. House, Colston Ave., Bristol, 7.15 p.m.

I.E.S. (Bradford Group).—"Interior Decoration and its Influence on Lighting." Y.E.B., 45-53 Sunbridge Rd., 7.30 p.m.

I.E.E. (London).—Annual dinner at Grosvenor House, Park Lane, 7 p.m.

FRIDAY, FEB. 27

E.P.E.A. (Southern Tech. Group).—"Behaviour and Failure of Metals under Service Conditions in Supply Industry." H. E. Davies. B.E.A. Offices, Portsmouth, 7.p.m.

I.E.E. (Mersey and N. Wales Centre).—"Domestic Electrical Installations: Some Safety Aspects." H. W. Swann. Elect. House, Llandudno Junction, 6.30 p.m.

MONDAY, MAR. 2

A.S.E.E. (Leeds Branch).—"From Nebula to Man." W. L. Whittle. Great Northern Hotel, 7.30 p.m.

I.E.E. (Mersey and N. Wales Centre).—Discussion on "Economies in Wiring Practice." Forbes Jackson, P. McKearney and A. V. Milton. Royal Instn., Colquitt St., Liverpool, 6.30 p.m.

I.E.E. (N.E. Radio and Measurements Group).—"Improved Scanning Electron Microscope for Opaque Specimens." D. McMullen. King's College, Newcastle, 6.15 p.m.

I.E.E. (S. Midland Centre).—"Review of Electricity applied to Mining." B. L. Metcalf. James Watt Inst., Gt. Charles St., Birmingham, 6 p.m.

I.E.E. (Western Supply Group).—"Electricity Supply—Statistical Approach to Particular Problems." R. B. Rowson. Inst. of Engrs., Park Place, Cardiff, 6 p.m.

I.E.E. (Ipswich). — "Electrical Equipment of Battery Road Vehicles." W. D. Shears. Crown and Anchor Hotel, 6 p.m.

E.P.E.A. (London). "Superimposed Frequency Control Systems." J. F. Mackenzie. Caxton Hall, Westminster, 7 p.m.

TUESDAY, MAR. 3

A.S.E.E. (S.E. London Branch).—"Television Production." Congregational Church Hall, Court Rd., Eltham, 8 p.m.

A.S.E.E. (W. London Branch).—"Floodlighting of Sports Arenas." A. C. Holden. Windsor Castle Hotel, King St., Hammersmith, 7.30 p.m.

I.E.E. (Cambridge Radio Group).—"New Approach to Housing Estate l.v. Distribution." H. T. Ransley, University Arms Hotel, 7 p.m.

I.E.E. (N.W. Centre).—"Industry and the Common Law." Prof. W. Mansfield Cooper. Engrs. Club, Albert Sq., Manchester, 7 p.m.

I.E.E. (S.W. Scotland sub-centre).—"Place of Steam, Water and Wind Power in Integrated Scheme for Generation of Electricity." C. W. Marshall, A Feiner and J. Venters. 39 Elmbank Cresent, Glasgow, 7 p.m.

I.E.S. (Stoke Group).—"Lighting of TV Studios." M.E.B., 31 Kingsway, 6 p.m.

INSTN. OF ENGRNG. INSPECTION (Coventry).—"Atom in Engineering." H. C. Smith. Tech. College, 7.30 p.m.

WEDNESDAY, MAR. 4

I.E.E. (Sheffield sub-centre).—Faraday Lecture "Light from Dark Ages, or Evolution of Electricity Supply." A. R. Cooper. Grand Hotel, 6.30 p.m.

I.E.E. (Rugby sub-centre).—"Royal Festival Hall: Electrical Installation." J. G. Hunter. College of Technology and Arts, 6.30 p.m.

I.E.E. (Southern Centre).—"Electronic Telephone Exchanges." T. H. Flowers. The University, Southampton, 6.30 p.m.

I.E.S. (Edinburgh Centre).—Annual dinner and Social.

I.E.S. (Newcastle Centre).—"Luminescence as Applied to Lighting." H. G. Jenkins and A. H. McKeag. Roadway House, 8 Oxford St., 6.15 p.m.

INST. OF WELDING (Manchester).—"Pressure Welding." A. B. Sowter and R. K. Hilton. College of Technology, 7.45 p.m.

THURSDAY, MAR. 5

A.S.E.E. (S. London Branch).—"Electrical Installations." W. F. Parker. Cafe Royal, Croydon, 8 p.m.

I.E.E. (London).—"Design Features of Certain British Power Stations." S. D. Whetman and A. E. Powell, Savoy Place, W.C.2, 5.30 p.m.

I.E.S. (Glasgow Centre).—Annual dinner and social.

I.E.S. (Nottingham Centre).—"Lighting of Power Stations" L. H. Hubble. Elect. Offices, Smithy Row, 6 p.m.

I.E.S. (Exeter Group).—"Outdoor Illumination." H. A. Turner, The Providence Hall, Northernhay St., 7 p.m.

BRITISH INSTN. OF RADIO ENGRS. (Scottish Section).—"Electronics in Nuclear Research." J. M. Reid. Glasgow University.

INCORP. PLANT ENGRS. (Peterborough). — "Modern Refrigeration." Gas Offices, Church St., 7.30 p.m.

INST. OF WELDING (N.E. Branch). "Hard Surfacing of Steel by Electric Welding." W. D. Biggs.

FRIDAY, MAR. 6

A.S.E.E. (Liverpool Branch).—"Effect of Electric Shock on Humans." D. A. Picken. Engineering Soc., 9 The Temple, Dale St., 7.30 p.m.

I.E.E. (E. Midland Centre).—Annual dinner at Victoria Station Hotel, Nottingham, 6.45 p.m.

I.E.E. (Scottish Centre).— Annual dinner at Grand Hotel, Edinburgh.

I.E.E. (N. Staffs sub-centre).—"Logical Approach to Problems of Electric Space-Warming." D. H. Parry. Elect. Showroom, Stoke, 7 p.m.

I.E.S. (Bath and Bristol Centre).—"Outdoor Illumination." H. A. Turner. Elect. Board, Colston Ave., Bristol, 6.15 p.m.

BIRMINGHAM ELECTRIC CLUB.—Annual dinner.

EXHIBITION DIARY

Daily Mail Ideal Home. Opens on Mar. 3 at Olympia, London, and continues until Mar. 28.

Factory Equipment. Opens on Mar. 23 at Royal Horticultural Society's New Hall, Westminster. Closes on Mar. 27.

Electrical Engineers' Second National Exhibition will open at Earls Court on Mar. 25, continuing until Mar. 28.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Eutec-Chamfer-Trode. B 707,466 Class 9. Electrodes for use in metal working. Eutectic Welding Alloys Co. Ltd., 156/158, Abbey House, Victoria St., S.W.1.

Lamplifier. B686,669. Class 9. Sound amplifying instruments and apparatus, etc. Thompson Diamond and Butcher, Ltd., 34 Farringdon Rd., E.C.1.

Mulsamix. 712,892. Class 7. Food mixing machines. Peerless and Ericsson, 6 Lygon Place, Grosvenor Gdns., S.W.1.

National. 705,691. Class 7. Electrical machines for cleaning instruments, etc., soldering machines and watch glass cutting machines. Saul Lanzetter, 36-40, New Brown St., Manchester 4.

Noname. 712,698. Class 9. Cables. Shardlow Electric Wires Ltd., Moseley Building, 56 Moseley St., Manchester.

Pifco. 713,230. Class 9. Appliances for massage of the face and body, etc., 713,231. Class II. Table lamps, flash lamps, electric torches, etc. Pifco, Ltd., Pifco House, Watling St., Manchester 4.

Sarah. 713,324. Class 9. Radio location instruments, etc. Ultra Electric, Ltd., Ultra Works, Western Ave., Acton, W.3.

ROBUST

yet sensitive..

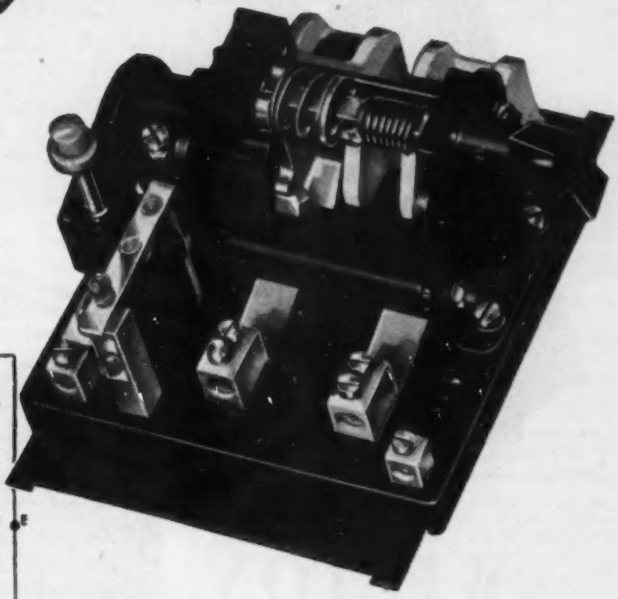
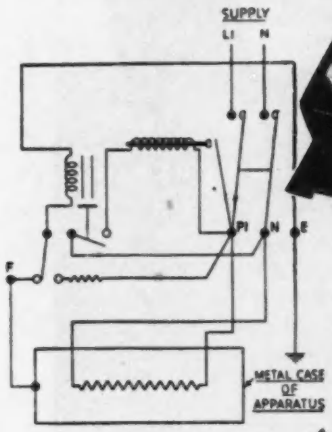


DIAGRAM OF CONNECTIONS :



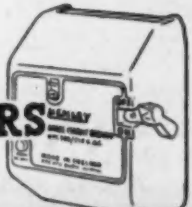
The design of the HENLEY Earth-Leakage Circuit-Breaker incorporates an entirely new method of operation with a complete absence of toggles and delicate mechanism. The full mains voltage is utilized to operate the Circuit-Breaker by means of an integral relay system. Complies with B.S. 842-1939. Full details in Booklet 53/B.

Delivery from stock

HENLEY

EARTH-LEAKAGE CIRCUIT-BREAKERS

(VOLTAGE OPERATED)



W.T. HENLEY'S TELEGRAPH WORKS CO. LTD. 51-53 HATTON GARDEN, LONDON, E.C.1

WESTON
Electrical Measuring Instruments

No. 1 Laboratory Instruments

The experience gained from over 60 years in the design and manufacture of precision instruments is embodied in Weston Laboratory Standards. Endless care in the selection and ageing of materials and in the assembly and calibration of the instruments ensures the maintenance of the extremely high accuracy of 0·1%. Features include 12" Vernier Scale, magnetic shielding and self-contained thermometer. Full details of these instruments and of the full Weston range of switchboard, panel, first grade and sub-standard instruments are available on request.

SANGAMO WESTON LIMITED

Enfield, Middlesex ***Grams: Sanwest, Enfield***

Tel: Enfield 3434 (6 lines) and 1242 (4 lines)

Branches: Glasgow, Manchester, Newcastle-on-Tyne, Leeds, Liverpool, Wolverhampton, Nottingham, Bristol, Southampton & Brighton

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WORK WANTED WANTED · FOR SALE

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

SOUTHAMPTON C.B.C.

SOUTHAMPTON C.B.C. invites TENDERS from Electrical Contractors for REWIRING electrical installation at Central Boys, Girls and Infants School. Forms and particulars from Borough Architect on £5 deposit by March 2, 1953. R.I.B.A. Contract plus Supplementary Conditions available for inspection. Deposit refunded on receipt of bona-fide tender not subsequently withdrawn or return of documents. Tender to Town Clerk, Civic Centre, Southampton by 10 a.m., Monday, March 16, 1953. (C 706)

CITY OF DURHAM

TENDERS are invited for the ELECTRIFICATION of 320 Council houses at present lit by gas. The contract comprises the supply and installation of all the equipment necessary for providing light and power supply.

A plan showing the house types may be seen and a copy of the specification and form of tender obtained at the office of the City Engineer, Town Hall, Durham, during normal office hours, upon payment of a deposit of two guineas which will be refunded on receipt of a bona-fide tender not afterwards withdrawn and the return of all documents.

Tenders enclosed in plain sealed envelopes endorsed "Electrification of Council Houses," but not bearing any name or mark indicating the sender, must be delivered at my office on or before Friday, March 13, 1953. The Council's standing orders provide that no tenders will be received except those sent in complying with the above direction.

The Council does not bind itself to accept the lowest or any tender.

D. B. MARTIN-JONES,
Town Clerk.

32 Claypath,
Durham. (C 709)

CITY OF BELFAST

Electricity Department

DRAINAGE PUMPING EQUIPMENT
Victoria Power Station

TENDERS are invited for the SUPPLY, DELIVERY and ERECTION of drainage pumping equipment and complete pump-house equipments including 600 g.p.m. pumps, motors, pipes, valves, steelwork, access flooring and lifting tackle.

Form of Tender (No. N.1349), conditions and specification, in quintuplicate, may be obtained from Messrs. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-upon-Tyne 1, on payment of a deposit of five guineas which will be refunded provided a bona-fide tender is lodged and not withdrawn. Extra copies of the contract documents may be obtained at one guinea each; this sum will not be returnable. Cheques should be made payable to the Belfast Corporation Electricity Department.

Each tender, in quadruplicate, in sealed envelope marked "Tender for Drainage Pumping Equipment, Electricity Committee," and endorsed with the name and address of the tenderer, must reach the undersigned not later than 4 p.m. on Friday, April 10, 1953.

An official receipt must be obtained for each tender delivered by hand. Tenders sent by post should be registered.

The lowest or any tender will not necessarily be accepted.

JOHN DUNLOP,
Town Clerk.

City Hall, Belfast.
February 20, 1953. (C 710)

BOROUGH OF EVESHAM

STREET LIGHTING

TENDERS are invited for the SUPPLY AND INSTALLATION of 24 No. 140 Watt sodium vapour lighting units together with auxiliary equipment and tubular steel columns, mounting height 25 ft, at Avonside—Waterside, A.44.

Plans and conditions of contract may be inspected at, and specification, bill of quantities and form of tender may be obtained from the Borough Surveyor, 1 Leicester Gables, High Street, Evesham, on receipt of £2 2s. returnable after receipt of a bona-fide tender which is not withdrawn.

Tenders, in plain sealed envelopes endorsed "Street Lighting," must be received by the undersigned not later than noon, Saturday, March 14, 1953.

The Council do not bind themselves to accept the lowest or any tender.

N. F. DAVIES,
Town Clerk.

Town Clerk's Office,
3 Leicester Gables,
High Street, Evesham.
February 25, 1953. (C 707)

APPOINTMENTS VACANT

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

SOUTHERN RHODESIA PERMANENT FORCES

VACANCIES exist for RADIO MECHANICS (trade grouping not lower than Group "A" (II)) and WIRELESS AND LINE OPERATORS (not lower than Group "B" (II)). Preference for ex-Royal Corps Signals, under 35. Three-year engagement initially, every prospect permanency, good pension after 20 years' service.

Starting rank Corporal £492 p.a. Excellent prospects of promotion. (Sergeant £732, W.O. II £981, W.O. I £1,095 to £1,167). All commissions from the ranks.

Allowances. (Married men). Marriage £50 p.a. Children £60 p.a. first, £24 p.a. each other dependent child. Quarters up to £180 p.a.

Application forms and further details from the Secretary, Rhodesia House, 429 Strand, London W.C.2. (C 720)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, COMMERCIAL ASSISTANT in District 349 (Penarth and Barry) in the Central Sub-Area.

Successful applicant will be required to assist in d.c./a.c. changeover and generally in all commercial duties in the district.

Salary in accordance with Class "D," Grade 10 (£531 to £539 to £547) of the N.J.B. Schedule.

Applications stating age, present position and salary, qualifications and experience and giving three referees to be addressed to the Secretary to arrive by March 7, 1953.

D. G. DODDS,
Secretary.

St. Mellons,
Cardiff. (C 716)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the following positions in the Division:—

CIVIL ENGINEERING DRAUGHTSMEN
Construction Department, North Wilford
Vacancy No. 22/53

Candidates should have experience in design and detail of reinforced concrete structures, piled and slab foundations for heavy plant, culverts, cable subways, etc., or general building construction, drainage and sanitation schemes, associated with offices and administrative buildings.

The salary will be in accordance with Grade 5 (£567 to £671 per annum) or Grade 6 (£433 to £567 per annum) of Schedule "D" of the National Joint Board Agreement.

This position will be pensionable under the British Electricity Authority and Area Boards Superannuation Scheme.

Applications should be submitted on Form A.E.6/ACT, which may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and returned to the undersigned. Please quote Vacancy Number.

JUNIOR ENGINEERS (4) SHIFT CONTROL DUTIES
Northampton Power Station
Vacancy No. 23/53

Candidates should have a sound engineering training with subsequent experience in a modern generating station, and preferably have gained an Ordinary or Higher National Certificate in Electrical Engineering.

The salary will be in accordance with Schedule "A," Class "G," Grade 15 (£407 per annum) progressing to Class "G," Grade 14 (£473 to £491 per annum).

This position will be pensionable under the British Electricity Authority and Area Board Superannuation Scheme.

Applications should be submitted on Form A.E.6/ACT which may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and returned to the undersigned to reach him by March 6, 1953. Please quote Vacancy Number.

ASSISTANT JOINT WELFARE OFFICER
Vacancy No. 25/53

Applications are invited for this post. The successful applicant will be required to cover all detailed aspects of welfare, e.g. working amenities, sports and social activities, personal services and work connected with the advisory machinery, in the East Midlands Division. The main qualifications for the post are initiative, drive, a high sense of duty, personality, organising ability, enthusiasm and a keen understanding of human factors.

Possession of a car would be an advantage for which appropriate allowances would be paid.

The post will be pensionable within the terms and conditions of the British Electricity Authority and Area Board Superannuation Scheme.

The salary will be in accordance with Grade 4 of the National Joint Council Agreement (£580 to £640 per annum).

Applications, submitted on the official form from the Divisional Establishments Officer, British Electricity Authority, British Electricity House, Barker Gate, Nottingham, must be returned to the undersigned not later than March 11, 1953. Please quote Vacancy Number.

L. F. JEFFREY,
Divisional Controller.
(C 723)

EASTERN ELECTRICITY BOARD

Chilterns Sub-Area

THIRD ASSISTANT ENGINEER
Bedford District

APPLICATIONS are invited for the appointment of Third Assistant Engineer in the Bedford District of the Chilterns Sub-Area.

Candidates should have had a sound training in electrical engineering and experience of the construction, operation and maintenance of l.v. and h.v. underground and overhead systems including substations.

The salary for the appointment will be in accordance with Class "F," Grade 9, of the National Joint Board Salary Agreement, commencing at £997 p.a. Both future salary and conditions of service will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

The successful candidate will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Applications by letter stating age, education, qualifications and experience, with details of present appointment and salary, should be submitted to the District Manager —Bedford, Eastern Electricity Board, Prebend Street, Bedford, within 14 days of the appearance of this advertisement.

Previously advertised in September, 1952, applications submitted on that occasion will automatically be re-considered. (C 713)

BRITISH ELECTRICITY AUTHORITY

South Western Division

TECHNICAL STAFF VACANCIES

(a) DEPUTY POWER STATION SUPERINTENDENT, Plymouth "B" Generating Station. N.J.B. "G.3," £971-£1,014.

(b) STATION SHIFT CONTROL ENGINEER, Bath Generating Station. N.J.B. "D.10," £531-£547.

(c) STATION SHIFT CONTROL ENGINEER, Exeter Generating Station. N.J.B. "D.10," £531-£547.

(d) STATION SHIFT CONTROL ENGINEER, Feeder Road Generating Station. N.J.B. "E.10," £555-£569.

Superannuation scheme.

Candidates for (a) should have had a good technical education and considerable practical experience in the operation, maintenance, and administration of a large generating station equipped with P.F. fired boilers and should preferably be corporate members of one of the recognised engineering institutions.

Candidates for (b), (c) and (d) should possess good technical qualifications, and have had training and experience in the control and operation of steam generating plant and main switchgear.

Application forms obtainable from the Divisional Secretary, 26 Oakfield Road, Bristol 8, to be returned by March 7, 1953. (C 724)

UGANDA ELECTRICITY BOARD

APPLICATIONS are invited for the appointment of ELECTRICAL TECHNICIAN to undertake the installation, maintenance and repair of communications equipment.

Applicants should have sound experience of v.h.f. radio installations and automatic telephone systems. Experience with power line carrier installations would be an added advantage.

The salary scale would be £754 by £52 to £1,014 which includes a temporary cost-of-living allowance at present 30 per cent. of basic salary. The point of entry on this scale would depend on age and experience.

Free partly-furnished accommodation or allowance in lieu; free medical and dental treatment; three-year contract in first instance, with free passages for the successful candidate and family, up to a maximum of three adult fares. Leave on full pay at end of contract.

Application forms and further information obtainable from the Board's London Offices, 27 Regent Street, London S.W.1. Applications should reach the Board's London offices not later than March 15, 1953.

C. R. WESTLAKE,
Chairman.
(C 729)

BRITISH ELECTRICITY AUTHORITY

North Western Division

VACANCY No. 856 (Re-issue).—MAINTENANCE ENGINEER (ELECTRICAL), Stuart Street Generating Station. Salary £833 to £998 (N.J.B. Grade 6, Class "H"). Candidates should preferably be Corporate Members of the Institution of Electrical Engineers or holders of equivalent qualification, and should have had wide experience of power station electrical equipment and practical experience of e.h.v. switchgear and protective gear. (Previous applicants for this post will automatically be re-considered).

Vacancy No. 26/53—SHIFT CHARGE ENGINEER, Huncoat Generating Station. Salary £697 to £718 (N.J.B. Grade 7, Class "F").

Vacancy No. 27/53—STATION SHIFT CONTROL ENGINEER, Bury Generating Station. Salary £555 to £569 (N.J.B. Grade 10, Class "F").

Vacancy No. 28/53—SHIFT CHARGE ENGINEER, Bury Generating Station. Salary £649 to £681 (N.J.B. Grade 7, Class "E").

Apply, quoting vacancy No. to Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20, before March 7. (C 711)

BRITISH ELECTRICITY AUTHORITY

London Division

JUNIOR ENGINEER (CONTROL)
Brunswick Wharf Generating Station

APPLICATIONS are invited for the above superannuable post. Salary and conditions of service in accordance with N.J.B. Agreement, Schedule "A."

Qualifications: Minimum Ordinary National Certificate in Electrical Engineering. Duties include assisting in main control room. Affords opportunity for general knowledge of power station. Salary: Class "H," Grade 15, £457 p.a. including London Allowance.

Applications recently received for position of Junior Engineer (Operation) for this station will be considered in conjunction with above post unless otherwise notified.

Applications will only be considered on form obtainable from Divisional Secretary, B.E.A. London Division, Generation House, Great Portland Street, W.1, and returned within 14 days of this advertisement. (C 721)

BRITISH ELECTRICITY AUTHORITY

South Eastern Division

BRIGHTON "A" and "B" POWER STATION. ASSISTANT ENGINEER (HANDLING). Applicants who should possess a knowledge of shipping, coal storage and its associated problems will be responsible for the operation of the coal and ash handling plant and associated equipment, including mobile equipment. Experience in the control of labour is essential. Class "L," Grade 12, £867 per annum.

Croydon "B" Power Station. JUNIOR ENGINEERS (Control). Applicants should preferably possess education qualifications equivalent to Higher National Certificate and should have had experience in the operation of e.h.t. switchgear and parallel running of alternators. Class "J," Grades 18/14, commencing at £415 per annum including London Allowance. N.J.B. conditions of service for both positions.

Applications giving details of present position, education, experience, etc., should be received by either Station Superintendent, Brighton Power Station, Portslade-by-Sea, or Station Superintendent, Croydon "B" Power Station, Beddington Farm Lane, Purley Way, Croydon, Surrey, not later than March 9. (C 714)

SOUTH EASTERN ELECTRICITY BOARD

ASSISTANT DISTRICT COMMERCIAL ENGINEER
Croydon District

SALARY of £697 to £707 to £718 p.a., plus London Weighting, N.J.B. "F.7." Superannuable. Applicants should be suitably qualified and capable of operating a large apparatus repair workshop. A sound knowledge of electrical contracting work is essential.

Applications, on forms obtainable from H. Lowe, M.I.E.E., Croydon Manager, SEEBoard, Electric House, Wellesley Road, Croydon, to be returned to him by March 11, 1953.

JUNIOR ASSISTANT DISTRICT ENGINEER
Worthing District

Salary £433 under N.J.B. "E.14." Applicants should have had a sound technical training in electrical engineering and experience in the construction, operation and maintenance of underground and overhead systems up to 33 kV.

Applications, giving two referees, must reach M. J. Mortimer, M.I.E.E., District Manager, SEEBoard, Electric House, Chapel Road, Worthing by March 11, 1953.

A. L. BURNELL,
Secretary.
(C 715)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following superannuable post. National Joint Board salary and conditions.

JUNIOR ENGINEER
Norwich Generating Station.

Salary, Class "F," Grade 15, £390; Grade 14, £466 per annum.

The duties of the successful applicant will include assisting in the control room on shift and other operation and investigation duties. Preference will be given to applicants who have had previous experience in a generating station and who have reached the standard of the Ordinary National Certificate in electrical engineering or its equivalent.

Applications stating age, qualifications and experience, should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, by March 7, 1953.

W. N. C. CLINCH,
Controller.
(C 708)

LONDON ELECTRICITY BOARD

JUNIOR ENGINEER (TEST)

APPLICANTS are invited for the above position in the Meter and Testing Branch of the Western Sub-Area based at Fulham, S.W.6.

Applicants should have had a sound general education, and preferably possess an engineering degree or Higher National Certificate of electrical engineering. They should have served an apprenticeship with a large engineering manufacturer or supply undertaking, and have had experience in general electrical testing and in the testing of protection apparatus.

The post is graded under Schedule "A" of the National Joint Board Agreement as Class "L," Grade 10—commencing salary £458 per annum inclusive, rising, in accordance with Clause 35, to Grade 18, £552 6s. to £574 7s. per annum, inclusive of London Allowance.

Application forms obtainable from Establishments Officer, 46 New Broad Street, E.C.2, to be returned completed by March 7, 1953. Please enclose addressed foolscap envelope and quote reference EST/1539/T. on all correspondence. (C 727)

CENTRAL ELECTRICITY BOARD
FEDERATION OF MALAYA

ELECTRICAL ENGINEER for hydro-electric work (M.28728.B), ASSISTANT POWER STATION SUPERINTENDENT (M.28769.B), and OPERATION AND EFFICIENCY ENGINEER (M.28770.B) required by the Central Electricity Board, Federation of Malaya. Option of appointment either (a) on agreement for three years in the first instance leading, subject to satisfactory service, to an offer of permanent employment on the pensionable establishment, with opportunity of terminating appointment at the end of the first year's service if so desired; or (b) on contract for three years with a gratuity at the rate of £50 or £70 for each completed period of three months' service, according to salary. Allowances, additional to those mentioned below, ranging between £210 and £630 a year are payable to married men according to salary and dependants. Free passages. Liberal leave on full salary.

Electrical Engineer for hydro-electric work. Salary (including allowances) payable in local currency equivalent at present Government rate of exchange to £1,218, rising to £2,100 a year. Commencing salary according to age, war service and experience. Candidates must be able to carry out preliminary investigations for hydro-electric schemes; to arrange for surveys for projected schemes; to prepare designs and contracts for small schemes up to 10,000 kW and to supervise the construction of the works. They should preferably be Corporate Members of the Institution of Civil Engineers or possess qualifications carrying exemption from Sections A and B of the Institution's examination. Those who are not so qualified would be eligible for salary on a lower scale equivalent to £1,197, rising to £1,862 a year (including allowances).

Assistant Power Station Superintendent. Salary (including allowances) payable in local currency, equivalent at present Government rate of exchange to £1,904, rising to £2,100 a year. Candidates must have wide experience of station maintenance and operation and preferably have held a similar position in a steam power station of not less than 80 MW capacity or as a charge engineer for at least five years in a station of not less than 120 MW capacity.

Operation and Efficiency Engineer. Salary (including allowances), payable in local currency, equivalent at present Government rate of exchange to £1,687, rising to £2,100 a year. Candidates must have had good power station experience including some years as a charge engineer in a modern steam station, and have a knowledge of the principles of combustion, thermal cycles and heat balances, system control, and the economics of operation. Candidates should preferably be Corporate Members or Graduates of the Institutions of Electrical or Mechanical Engineers or hold an equivalent qualification. Those who are not so qualified would be eligible for salary on a lower scale equivalent to £1,673, rising to £1,862 a year.

Apply at once by letter, stating age, full names in block letters, and full particulars of qualifications and experience, and mentioning this paper, to the Crown Agents for the Colonies, 4 Millbank, London S.W.1, quoting on letter the reference number against the appointment for which application is made. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. (C 722)

SOUTHERN ELECTRICITY BOARD

JUNIOR ENGINEERS

ALDERSHOT District of No. 3 (Portsmouth) Sub-Area. One located at Aldershot and one at Petworth. Salary N.J.B. Class "F," Grade 15, Column 1 (£390 per annum). N.J.B. conditions of service.

Applicants should have experience in the design, construction, operation and maintenance of h.v. and l.v. overhead and underground distribution equipment, and possess suitable technical qualifications. The appointments will involve standby duties.

Applications on forms obtainable from the Sub-Area Secretary, Lower Drayton Lane, Cosham, Portsmouth, and returned to him in envelopes suitably endorsed not later than March 9, 1953.

AGRICULTURAL REPRESENTATIVE

Reading District of No. 2 (Newbury) Sub-Area. Salary N.J.C. Grade 3 (£520-£580 per annum). N.J.C. conditions of service.

Candidates should have a sound knowledge of the applications of electricity in agriculture and horticulture, be capable of preparing estimates for wiring installations and equipment; conducting negotiations and obtaining new business. Ability to give talks to agricultural organisations will be an advantage.

Applications on forms obtainable from the Sub-Area Secretary, 7 Oxford Road, Newbury, and returned to him in envelopes suitably endorsed not later than March 9, 1953.

The successful candidates for the above appointments will be required to contribute to the B.E.A. and Area Boards' superannuation scheme, if eligible. (C 725)

YORKSHIRE ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

No. 5 (Wakefield) Sub-Area

Barnsley District

GENERAL ASSISTANT DISTRICT ENGINEER

Applicants should preferably be graduate members of the Institution of Electrical Engineers and have experience in the construction, operation and maintenance of overhead and underground distribution systems.

Candidates should be prepared to reside in the district and undertake standby duties.

Salary, N.J.B. Class "F," Grade 11, £548-£565 per annum.

Applications, giving details of age, qualifications and experience, should be forwarded to the Manager, No. 5 (Wakefield) Sub-Area, Yorkshire Electricity Board, 1a Denby Dale Road, Wakefield, not later than March 12, 1953.

No. 4 (Leeds) Sub-Area

FEMALE DEMONSTRATOR

Candidates must have had a two-year full-time course in domestic subjects at a recognised training college and preferably possess the E.A.W. Certificate. The person appointed will normally be located at Leeds but will be required to work throughout the Sub-Area as occasion demands.

Salary, N.J.C. Grade 1, £380-£470 per annum.

Applications, giving full details of age, qualifications and experience, should be forwarded to the Manager, No. 4 (Leeds) Sub-Area, Yorkshire Electricity Board, Bramhope, Leeds, not later than March 12, 1953.

No. 6 (Hull) Sub-Area

Goole District

JUNIOR ENGINEER

Applicants should hold the Higher National Certificate in Electrical Engineering, or equivalent qualifications, and have had training and experience in the construction, operation and maintenance of h.v. and l.v. overhead and underground distribution systems.

The successful applicant will be required to reside in Goole and carry out standby duty.

Salary, N.J.B. Class "D," Grade 15/14, £390-£423 per annum.

Applications, giving full details of age, qualifications and experience, should be forwarded to the Manager, No. 6 (Hull) Sub-Area, Yorkshire Electricity Board, Ferensway, Hull, not later than March 12, 1953. (C 726)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, an ASSISTANT in the Commercial Department of District 102 (Fishguard) in the Western Sub-Area.

Applicants must have had experience in the application of electricity to domestic and commercial premises and all general purposes.

Salary in accordance with Class "A," Grade 7 (£493 to £515 to £537) of the N.J.B. Schedule.

Applications stating age, present position and salary, qualifications and experience and giving three referees to be addressed to the Secretary to arrive by March 7, 1953.

D. G. DODDS,
Secretary.

St. Mellons,
Cardiff. (C 717)

BRITISH ELECTRICITY AUTHORITY

South East Scotland Division

ASSISTANT SHIFT CHARGE ENGINEER required for Portobello Power Station.

Applicants should preferably have experience in operation of turbo-generators, water tube boilers and h.t. electrical plant. Certificated marine engineers would be considered.

Salary £680 to £706 (N.J.B. Class "H/9"). Pension scheme.

Apply by March 7, 1953, to Divisional Controller, British Electricity House, Portobello, Midlothian. (C 712)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, an ASSISTANT ENGINEER (SUB-STATIONS) in District 342 (Merthyr) in the Central Sub-Area.

Applicants should have experience of construction and maintenance work in all types of a.c. substations up to 33 kV and should preferably also have experience in the operation and maintenance of rotary conversion plant.

Salary in accordance with Class "E," Grade 9 (£587 to £593 to £600) of N.J.B. Schedule.

Applications stating age, present position and salary, qualifications and experience and giving three referees to be addressed to the Secretary to arrive by March 7, 1953.

D. G. DODDS,
Secretary.

St. Mellons,
Cardiff. (C 718)

THE BRITISH IRON AND STEEL RESEARCH ASSOCIATION

ELECTRICAL ENGINEER required by the Plant Engineering Division of the above Association to carry out applied research in the iron and steel industry. Honours degree in electrical engineering essential. Age range 23 to 28. Starting salary according to age, qualifications and experience. Post is superannuated under the F.S.S.U. Location of work, London.

Written applications only to Personnel Officer, B.I.S.R.A., 11 Park Lane, London W.1. (C 728)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, ELECTRICAL FITTER in District 349 (Barry), 3s. 6id. per hour—44-hour week.

Applicants should have served a recognised apprenticeship and experience in the erection and maintenance of high voltage electrical substation equipment is essential.

Applications to the Secretary, St. Mellons, to arrive by March 7, 1953.

D. G. DODDS,
Secretary.

St. Mellons,
Cardiff. (C 719)

A SALES MANAGER age 35-45 is required by a medium-sized company manufacturing well-known electrical accessories. Applications are invited from men with experience of the trade and ability to foster sound sales promotion schemes. Pension scheme in operation.—Write fully, giving age, previous position and salary expected, to Box No. 2427, Electrical Times. (C 696)

A SALES REPRESENTATIVE required by widely known cable and electrical accessory manufacturers, for south and south-eastern areas of England. Existing connection among E.E.A. and wholesalers an advantage. Good salary, expenses and car allowance.—Write fully to Box No. 2413, Electrical Times. (C 685)

A WELL-KNOWN COMPANY in the Midlands requires a JUNIOR TRANSFORMER DESIGN ENGINEER. Previous experience of this type of work is essential. Housing assistance may be offered to suitable candidates. —Apply with full details, quoting Ref. BBE, to Box No. 2395, Electrical Times. (C 642)

APPLICATIONS are invited for the position of SENIOR TRANSFORMER DESIGN ENGINEER for transformers up to 10,000 kVA at 66 kV. Housing accommodation available.—Please apply, giving full details of qualifications and experience, to Box 2393, Electrical Times, marking your application "Senior Transformer Engineer." (C 640)

APPLICATIONS are invited from ENGINEERS, preferably aged 23 to 28 years, who have served a recognised apprenticeship with an electrical or mechanical engineering manufacturer and hold a Higher National Certificate or equivalent, for progressive appointment in the Standard and Specifications Department, Stafford. This department is concerned with the specifying and standardising of techniques, processes and materials used in a large range of the company's manufactures. Permanent position and pension scheme.—Write, giving full particulars and quoting reference 947B, to the Central Personnel Services, English Electric Co., Ltd., 336/7 Strand, London W.C.2. (C 701)

ARC AND GAS WELDER required. Must be first-class man with experience non-ferrous metals and brazing. Some experience of copper working and ability to undertake light constructional work an advantage. Good wages, working conditions and canteen facilities.—Apply, Personnel Dept., Garringtons, Ltd., Bromsgrove. (C 743)

AREA METER ENGINEER (House Service Meters) required for Scotland, North-Western and North-Eastern areas.

ALSO, one for Yorkshire, Midlands and South Wales areas.

Applicants should be resident or willing to reside more or less centrally within the area for which they apply.

Please state remuneration required, which is by salary and commission, also if car owner.

Write, giving particulars of age, previous experience, etc., to Box No. 2431, Electrical Times. All replies treated in strictest confidence. (C 732)

COPPERSMITH for interesting electrical construction work in development engineering department. Experience required of tube working and copper fabrication, first-class experience of brazing essential. Good wages, working conditions and canteen facilities.—Apply, Personnel Dept., Garringtons, Ltd., Bromsgrove. (C 742)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

BRITISH ELECTRICITY AUTHORITY. SCIENTIFIC STAFF, Research Laboratories, Leatherhead. Candidates should have a first- or second-class honours degree in electrical or mechanical engineering or in physics and preferably some research experience. Duties include testing, development and research work in the laboratories and in the field in connection with the generation, transmission and distribution of electricity. Appointments, which are superannuable, will be made within the following N.J.B. grades, according to qualifications and experience:—
SECOND ASSISTANT, Grade 3, £800-£1,150.
THIRD ASSISTANT, Grade 4, £717-£934.
Forms from D. Moffat, Director of Establishments, British Electricity House, Winsley Street, London W.1, to be returned by March 23, 1953. Quote ref. AE.337. (C 736)

DEPUTY POWER STATION SUPERINTENDENT required for service with the Sudan Light and Power Co., Ltd., in Khartoum—Anglo-Egyptian Sudan. Basic salary on appointment £E.1,500 per annum (£E.1 equals £1 0s. 6d.). Candidates should be between the ages of 30 and 40 and must be Corporate Members of the Institution of Mechanical Engineers; have had not less than 10 years' experience in the design, construction and operation of modern power stations equipped with boilers and turbo-alternators operating under steam conditions up to 400 lb. per sq. in. pressure and 750 deg. F. superheat; and e.h.t. switchgear and associated control equipment. Corporate membership of the I.E.E. and experience with oil-fired boilers and diesel alternators up to 1,200 kW also most desirable. Evidence should be adduced of having held positions of responsibility requiring organising and administrative powers and the ability to control staff. Initially duties will include relieving the Power Station Superintendent of day-to-day administrative work in the existing diesel power station; and supervising the erection and equipping of a steam station.
In addition to basic salary a cost-of-living allowance will be payable; and a kit allowance of £E.50 on appointment.
Appointment will be on contract up to 10 years, including a period of 12 months probation, with a bonus payable on completion of the contractual period. Free living accommodation with basic furniture or an allowance in lieu thereof and free transport will be provided. After satisfactory completion of the probationary period liberal leave on full salary with free passages. There is at present no income tax in the Sudan.
Applications stating age, education, qualifications, experience (with particulars of posts held), present appointment and salary with names of two references, should be submitted to the Secretary, The Power and Traction Finance Co., Ltd., Queens House, Kingsway, London W.C.2. (C 730)

DRAUGHTSMEN required for Transformer Drawing Office, previous experience of Power Distribution, Radio or Welding Transformers is desirable. Progressive positions are offered to men with initiative in expanding Department of modern works on Merseyside. Housing assistance available for selected applicants.—Reply, giving details of age, experience, present occupation and quoting Ref. AFA to Box No. 2365, Electrical Times. (C 543)

ELECTRICAL DESIGNER DRAUGHTSMAN with ONC (or Higher) and some experience of lighting and power layouts for refinery, chemical or similar plants required for London office of leading engineering company. This post offers good salary, sickness and pension benefits in a progressive organisation.—Give full details of age, qualifications and experience to Box No. 2429, Electrical Times. (C 704)

ELECTRICAL DRAUGHTSMAN required by Glasgow firm of engineers. Written applications desired in the first instance outlining technical education (which should be to at least O.N.C. standard), experience and salary required.—1423, Wm. Porteous and Co., Glasgow. (C 737)

ELECTRICAL DRAUGHTSMAN required for large paper mill by Bowater's Thames Paper Mills, Ltd., at Northfleet, Gravesend, Kent. Must be experienced in layout of power installations, wiring diagrams and switchgear. Some mechanical experience an advantage. —Please state age, experience, qualifications and salary required. (C 643)

ENGINEER-DRAUGHTSMAN, 24-28 years old, required for mechanical and electrical engineering problems in connection with the works engineering department of a large factory. Preference will be given to applicants holding a degree in engineering, but those with H.N.C. in either mechanical or electrical engineering will also be carefully considered. At least two years' d.o. experience is essential.
The post affords considerable opportunity for advancement in the plant engineering field to a young engineer with initiative.
Applications, giving details of age, training and experience, and stating salary required, to Box No. 2437, Electrical Times. (C 739)

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

ELECTRICAL MECHANICS required for h.f. heating equipment construction and maintenance. Must be first-class men with sound machine shop and bench fitting apprenticeship.—Apply, Personnel Dept., Garringtons, Ltd., Bromsgrove, Worcs. (C 745)

FOSTER TRANSFORMERS LTD., South Wimbledon S.W.19, require TRANSFORMER DESIGNERS and DRAUGHTSMEN. Annual bonus in addition to generally recognised pay rates. Good working conditions in modern factory with welfare and canteen services and active sports and social club. Conveniently situated with good tube and bus services.—Apply to the Personnel Officer. (C 606)

GENERAL MACHINISTS for turning, milling and boring operations. Interesting work on prototype development of automatic machines, and small batch production. Good wages, working conditions and canteen facilities.—Apply, Personnel Dept., Garringtons, Ltd., Bromsgrove, Worcs. (C 740)

IMPERIAL CHEMICAL INDUSTRIES, LTD., General Chemicals Division, invite applications for the following vacancies:—

SENIOR ASSISTANT ENGINEER (GENERATION), P/1

Applications are invited for the position of additional senior assistant engineer in the Generation Section of the company's Power Department, Runcorn, Cheshire. The duties are to assist, under the direction of the Generation Section manager in the headquarters of the department with the operation and maintenance of the division's power stations, which have an installed capacity of more than 100,000 kW and with the design of extensions thereto. Applicants, who should be between the ages of 30 and 38 years, and should hold a degree in mechanical or electrical engineering, must have had a sound mechanical engineering training and should have had considerable experience of the operation and maintenance of large modern high-pressure steam power stations. In addition they should have had some experience of the preparation of designs and specifications for new plant and of investigations and tests in connection therewith, while Corporate Membership of either the Institution of Mechanical Engineers or the Institution of Electrical Engineers is also desirable. Commencing salary up to £1,250. The selected candidate will be required to pass a medical examination and to join the company's pension fund.

SENIOR ASSISTANT ENGINEER (MECHANICAL), P/2

Applications are invited for the position of additional senior assistant engineer in the Mechanical Section of the company's Power Department, Runcorn, Cheshire. The duties are to assist, under the direction of the Mechanical Section manager, in the headquarters of the department with the maintenance of the mechanical equipment of the division's power stations, which have an installed capacity of more than 100,000 kW, and with the design of extensions thereto. Applicants, who should be between the ages of 30 and 38 years, and should hold a degree in mechanical engineering, must have had a sound mechanical engineering training and should have had considerable experience of the maintenance and design of the mechanical equipment of large modern steam power stations. In addition, they should have had some experience of the preparation of designs and specifications for new plant and investigations and tests in connection therewith, while Corporate Membership of the Institution of Mechanical Engineers is also desirable. Commencing salary up to £1,150. The selected candidate will be required to pass a medical examination and to join the company's pension fund.
Applications in writing, giving age and full particulars of education, technical qualifications, engineering training and power station experience, should be sent to the Staff Manager, Imperial Chemical Industries Ltd., General Chemicals Division, Cunard Building, Liverpool 3, quoting reference P/1 or P/2 as appropriate. (C 437)

INSULATION RESEARCH AND DEVELOPMENT ENGINEER. A senior post is vacant for an engineer experienced in the application of insulators and insulating materials in high-voltage power system apparatus. Applicants should be qualified to direct experimental and theoretical investigations into dielectric phenomena in general, stress control, corona, insulation co-ordination, new insulating materials and techniques. Modern, fully equipped laboratories are available. This is a responsible post carrying with it an appropriate salary.—Applications, which will be treated in strictest confidence, should be made with full particulars to Box No. 2443, Electrical Times. (C 753)

LANCASHIRE DYNAMO AND CRYPTO, LTD., have vacancies for COLLEGE GRADUATES for two-year apprenticeship course. Applicants must possess a B.Sc. degree or Higher National Certificate in electrical engineering. Suitable applicants will be eligible for permanent position after completion. Pension scheme in operation.—Applications, stating details of training, experience and age to Personnel Manager, Lancashire Dynamo and Crypto, Ltd., Trafford Park, Manchester 17. (C 644)

LARGE electric lamp and fittings manufacturers require MANAGER to control London order and distribution depot. Must have wide experience in office systems, stores and stock control distribution, and staff management. Good salary, superannuation scheme.—Write, stating age and experience, to Personnel Manager, Box D.670, Willing's, 362 Grays Inn Road, London W.C.1. (C 754)

OIL REFINERY CONTRACTORS require a qualified ENGINEER to be responsible for specifying and selecting all types of pumps, motors, turbines, compressors, etc., used in the refining industry.—Applicants should have had past experience of such equipment, particularly the application of process type centrifugal pumps to the petroleum industry. Write fully, Foster Wheeler, Ltd., 3 Ixworth Place, London S.W.3. (C 645)

PLUMBER JOINTER for Middle East. Experienced in jointing paper cables, lead covered and armoured, up to 11 kV.—Apply, stating age and experience, forward copies of testimonials or state names to whom we may apply, to Box No. 2435, Electrical Times. (C 735)

POWER PLANT AND SERVICES ENGINEER required for large factory in Manchester area. Plant comprises large modern h.p. water tube boilers, back pressure and condensing turbo-alternators, air compressors, deep well and service pumps, high pressure hot water heating services, and h.t. and l.t. electrical distribution services carrying loads of 10,000 kW. Applicants must have comprehensive and recent experience in operating such plant at maximum efficiency and maintaining it in the highest state of reliability. Salary up to £750, according to qualifications. A pension scheme is in operation.—Applications to state age, experience and technical qualifications, marking envelopes "Power Plant," to Box No 2419, Electrical Times. (C 691)

SHIFT CHARGE ENGINEERS (FOUR) required for service with the Sudan Light and Power Co., Ltd., in Khartoum—Anglo-Egyptian Sudan. Basic salary in the range £E.900 to £E.1,380 per annum. Candidates must have good general education and sound technical training with ability to control and instruct staff; and extensive experience in the operation of diesel generating sets up to 1,200 kW and e.h.t. switchgear and associated control equipment. Steam generating plant will be added in the near future and an extra qualification would be knowledge of, and experience in, the operation of steam turbo-alternator plant and oil-fired boilers up to 400 lb. per sq. in. In addition to basic salary a cost-of-living allowance will be payable; and a kit allowance of £E.50 on appointment.

Appointments will be on contract up to five years, including a period of 12 months probation, with a bonus payable on completion of the contractual period.

Free living accommodation with basic furniture or an allowance in lieu thereof. After satisfactory completion of the probationary period liberal leave on full salary with free passages. There is at present no income tax in the Sudan.

Applications stating age, education, qualifications, experience (with particulars of posts held), present appointment and salary, with names of two references, should be submitted to the Secretary, The Power and Traction Finance Co., Ltd., Queens House, Kinsway, London W.C.2. (C 731)

SUPERFINE WIRE. We are wanting an experienced TECHNICAL MAN, with intimate knowledge of the trade, for the development of nickel and nickel-alloy superfine wire for home and abroad. Ample scope and opportunity for advancement.—Give full details of technical and commercial experience, age, salary required: Box No. 2433, Electrical Times. (C 733)

TELEPHONE MANF. CO., LTD., have vacancies for two JUNIOR TECHNICAL SALES ENGINEERS of good appearance and personality, with experience of telecommunications industry. Preference given to those in possession of H.N.C. or O.N.C. The positions offered are progressive. Staff bonus and contributory pension scheme after probationary period.—Write fully, stating age and experience, to Personnel Dept., Hollingsworth Works, Martell Road, W. Dulwich, S.E.21. (C 734)

THE ENGLISH ELECTRIC CO., LTD., have a vacancy for a TRANSFORMER SALES AND CONTRACTS ENGINEER at their Liverpool Works to deal with "C" type cores and small transformers for electronic equipment. Candidates should have had experience of this type of work and preference will be given to candidates possessing a Higher National Certificate in electrical engineering.—Please reply, quoting ref. 898, to Central Personnel Services, English Electric Co., Ltd., 336/7 Strand, London W.C.2. (C 738)

TEMPLATE MAKER/PLATER for light constructions, fabricated machine frames and components. Applicants must be used to accurate working and preferably able to tackweld and effectively specify welding sequences. Good wages, working conditions and canteen facilities.—Apply, Personnel Dept., Garringtons, Ltd., Bromsgrove, Worcs. (C 741)

THE LANCASHIRE STEEL CORPORATION LTD., Irlam Works, Manchester, require ELECTRICIANS for general duties. Must have knowledge of heavy industrial plant installation, including switchgear and cabling work. Good bonus rates and prospects for suitable men.—Apply in writing to the Labour Manager. (C 758)

TRANSFORMER ENGINEER DESIGNER required for works in the London area with experience of 132-kV and higher voltages. Applications will be treated confidentially and should give particulars of age, experience and salary required.—Apply Box No. 2389, Electrical Times. (C 630)

VACANCIES exist for ELECTRICAL ENGINEERS, preferably under 30 years of age, holding B.Sc. degree in electrical engineering or physics, or possessing an equivalent qualification. Duties involve investigations into and laboratory testing of insulation for high-voltage switchgear. Previous experience on similar work would be an advantage, but is not essential.—Apply, with full particulars, to the Chief Engineer, A. Reyrolle and Co. Ltd., Hebburn, Co. Durham. (C 755)

VACANCIES exist in Development Engineering Section for two or three conscientious men to act as handymen/mates. Applicants must have good record for willingness and cleanliness and preferably have some trade capabilities. Good wages, working conditions and canteen facilities.—Apply, Personnel Dept., Garringtons, Ltd., Bromsgrove, Worcs. (C 744)

WELL-KNOWN electric cooker manufacturers require a LADY DEMONSTRATOR with experience to cover the North of England including Yorkshire.—Apply with full particulars to Box No. 2415, Electrical Times. (C 689)

WINDER, London area, all types of a.c. and d.c. rewinds, preferably accustomed low-voltage work. Steady appointment for suitable man.—Age, experience to Box No. 2399, Electrical Times. (C 647)

WORK WANTED

A.C. and d.c. MOTOR REWINDS and REPAIRS. Prompt service fully guaranteed. Edgware 5566 (4 lines).—Service Electric Co., Ltd., Stanmore, Middx. (C 16)

ARMATURE REWINDING SERVICE to the Trade. Vacuums, Drills, Grinders, Hood Dryers, Dental Motors, Vacuum Cleaner and Drill Armatures replaced from stock. 24-hour service. Every job guaranteed. All vacuum cleaner parts, hoses, etc., in stock for any make.—Regam Electric Cleaner Service, 95-97 Park Lane, Leeds 1. (C 657)

PRESSINGS, Assemblies, wire work, spot and arc welding, capstan work. Quick service. Large quantities material available. Quotations by return. Specialists in sub-contract work.—Mountsorrel Pressings, 20 Loughborough Road, Mountsorrel. (C 130)

WORK WANTED. Capacity available for all types of COIL WINDING.—Box No. 2425, Electrical Times. (C 695)

WANTED

A.C.-D.C. MOTORS, STARTERS, complete change-over installations, etc.—A.A. Electrical Co., Ltd., 67 Rothschild Road, Chiswick Park, W.4. Tel.: Chiswick 5105. (C 10)

ADVERTISER requires regular supplies secondhand upright VACUUM CLEANERS.—Box No. 2439, Electrical Times. (C 746)

ALTERNATORS, 2·75 kVA, by Crompton Parkinson required in quantities.—Box No. 2373, Electrical Times. (C 563)

LIGHTING SETS and small ALTERNATORS wanted, 230/1/50.—Hill, 200 High Street, Exeter. (C 748)

MULTI-ROLL BAR STRAIGHTENER required, suitable for hexagons, squares and flats up to 1½ in. a/f. Reply: Kiveton Park Steel and Wire Works Ltd., Kiveton Park, Nr. Sheffield. (C 759)

WANTED, D.C. and A.C. ball-bearing MOTORS, MOTOR GENERATOR SETS, DYNAMOS and ALTERNATORS.—Full details to Britannia Manufacturing Co., Ltd., 22-26 Britannia Walk, London N.1. (C 6)

WANTED. Exide h.t. PLATES, WJ120HW, also l.t. CZG.5s and 6s positive and negative groups.—Coates, Carlton, Wakefield. (C 747)

WANTED for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of secondhand machinery and plant for re-use.—W. and H. Cooper, Ltd., 176 Brady Street, Bethnal Green, E.1. (C 1)

WANTED. Large quantity of 4-in. outside diameter TUBES from the dismantling of old Babcock water tube boilers. Best prices paid. Prepared to purchase Babcock and Wilcox water-tube boilers for dismantling. —Apply, giving full details to Midland Iron and Hardware Co., Cradley Heath, Staffs. (C 2)

WANTED, ROTARY CONVERTERS, any size.—Universal, 221 City Road, London E.C.1. (C 8)

GENERATING PLANT

BOVING WATER TURBINE, Generator, Oil Pressure governor and switchboard, completely overhauled and surplus to requirements. All in excellent order.—Messrs. James MacGregor, Ltd., Garrion Grain Mills, Wishaw, Lanarkshire. (C 750)

DIESEL-DRIVEN GENERATING SETS.

930-kVA (550 kW) M.A.N./SIEMENS SCHUCKERT. Engine vert., 8-cyl., 2 stroke, water cooled, 375 r.p.m., direct coupled Alternator 6,300/3/50, 4 wire. Can be reconnected for 3,300 V.

409/450-kW CROSSLEY/CROMPTON PARKINSON. Engine vert., 6-cyl., 4 stroke, 375 r.p.m., direct coupled Generator 460 V, d.c., 3 wire.

250-kVA DEUTS/SIEMENS SCHUCKERT. Engine vert., 7-cyl., 4 stroke, rated to develop 290 b.p. at 500 r.p.m., compressed air starting, direct coupled Alternator, 6,300/3/50, 0·76 p.f. Direct coupled exciter.

220-kVA (165-kW) NATIONAL/L.D.C. Engine type FA5, vert., encl., 5-cyl., 4 stroke, speed 428 r.p.m., direct coupled Alternator 440/3/50, 0·75 p.f., 288 amps, 175 kW, 0·8 p.f., 12 hour rating, 428 r.p.m. with direct coupled exciter.

Three 200-kVA BELLISS & MORCOM BRUSH, engine vert., 6-cyl., 4 stroke, 600 r.p.m., direct coupled new Alternator 400/3/50. With control gear.

George Cohen Sons & Co., Ltd., Wood Lane, London W.12. Tel.: Shepherds Bush 2070 and Stanningley, near Leeds. Tel.: Pudsey 2241. (C 705)

MOTOR GENERATOR SETS, CONTROL PANELS, built to individual requirements. Good deliveries at competitive prices. All equipment guaranteed.—Thos. W. Ward, Ltd., Albion Works, Sheffield. Phone 26311 (ex 347). (C 668)

ONE 55-kW A.B.O.E. diesel-electric GENERATING SET, comprising McLaren engine alternator and switchgear. Run for only two or three weeks. £1,200. —London Rubber Co., Ltd., North Circular Road, Chingford, E.4. (C 651)

1,000 H.P. DIESEL ENGINE by English Electric. Type 8L 4-stroke. 375 r.p.m. 4,650 hours running only. Offered for immediate sale by major industrial organisation.—Box No. 2441, Electrical Times. (C 749)

LIGHTING EQUIPMENT

PURLEY CHOKES AND BALLASTS. Our 80 W tapped h.p.f. ballast, with starter switchgear-holder incorporated is proving itself the most popular unit. Suitable for most fittings. 57s. 6d. each, subject.—F. W. Blanshard, Ltd. (Dept. E.T.), Purley, Surrey. Uplands 4818-9. (C 17)

METERS

A.C./D.C. QUARTERLY and SLOT METERS.—Brent Electrical Co., 6 Holmdale Gardens, London, N.W.4. (C 7)

HOUSE-SERVICE METERS, a.c. or d.c., quarterly or prepayment.—Universal Electrical, 221 City Road, London E.C.1. (C 12)

CABLES & WIRE

FOR SALE, 47 silk-covered Eureka WIRE; 500 lbs; as new.—Box No. 2423, Electrical Times. (C 694)

PAPER INSULATED CABLES

of all sizes and all voltages at highly competitive prices.

Messrs. A. & H. EVANS

Birkbeck Road, Ilford, Essex

have a complete range between 11,000 and 660 V, and invite your inquiries.

Telephone: VALentine 2567 (C 756p)

ENGINEERING PLANT & MATERIALS

750,000

NEW BALL RACES, ROLLER THRUST AND TIMKEN RACES IN STOCK. STOCK LISTS AVAILABLE.

CLAUDE RYE BEARINGS

895-921 Fulham Road, London, S.W.6

RENown 6174 (20 lines) (C 27p)

QUANTITY of PRESS TOOLS, blanking and piercing for electric irons, fires and toasters, also bolsters and sub-press.—H. Histon, Ltd., New Summer Street, Birmingham 19. (C 590)

MOTORS & STARTERS

A.A. ELECTRICAL CO. FOR A.C./D.C. MOTORS-SWITCHGEAR, EXHAUST FANS, HOISTS, REDUCTION GEARS, new or reconditioned units.—Chiswick 5105. Chiswick 5605, 67 Rothschild Road, W.4. (C 9)

A.C. and D.C. MOTORS, all sizes, large stocks. Fully guaranteed.—Milo Engineering Works, Ltd., Milo Road, East Dulwich, S.E.22. (Forest Hill 2278-9.) (C 4)

A.C. and D.C. MOTORS, GENERATORS, from stock.—Service Electric Co., Ltd., Honeypot Lane, Stanmore, Middx. Edgware 5566-9. (C 11)

FOR ELECTRICAL MOTORS, GENERATORS, ALTERNATORS, SWITCHGEAR, please send your inquiries to Oldfield Engineering Co., Ltd., 99 East Ordsall Lane, Salford 5. (C 14)

All types and sizes of

Industrial Electrical Equipment

ELECTROPOWER COMPANY LIMITED

Kingsbury Works, Kingsbury Road, London N.W.9.

Telephone: COLindale 4621/2. (C 15p)

GEARED MOTORS, new, in stock. From 1 r.p.m. to 4 h.p. spur or worm gears by well-known makers.—Super Power Ltd., 81 North Side, Clapham Common, S.W.4. Battersea 3355. (C 429)

MOTORS, fractional. All types, all sizes, including flame-proof and geared, speeds 1 r.p. week to 20,000 r.p.m.—Jeary Electrical Co., Ltd., 324 Old Street, E.C.1. (Tel.: Sho 7511.) (C 697)

NEW A.C. MOTORS FROM STOCK. ¼ to 200 h.p. 400 V 3 ph. 50 cycles at 600, 750, 1,000 and 1,500 r.p.m. Immediate dispatch, competitive prices.—Thos. W. Ward, Ltd., Albion Works, Sheffield. Phone 26311 (ex 347). (C 689)

SWITCHGEAR

MERCURY SWITCHES are made by Hall Drysdale and Co., Ltd., of 58 Commerce Road, Wood Green, London N.22. Tel.: Bow 7221. (C 13)

TRANSFORMERS & CONVERTORS

TRANSFORMERS

Miniature to 25 KVA

Air and Oil Cooled

Voltage to 11KV

R. M. ELECTRIC LTD.

TEAM VALLEY GATESHEAD 11

(C 608p)

UNCLASSIFIED

PRESERVATION PACKING

Inquiries invited by

DENIS FERRANTI METERS LIMITED

Caernarvon Road, Bangor, Caerns.

Contractors to the Ministry of Supply, Ministry of Works, Air Ministry and the Crown Agents for the Colonies. (C 580p)

A.C. and d.c. MOTORS, DIESEL ALTERNATOR SETS, GENERATORS, TRANSFORMERS, WELDERS, PLATING PLANT, CONTROL GEAR, SWITCHGEAR, PORTABLE TOOLS, etc. Stock list post free.—Thos. W. Ward Ltd., Albion Works, Sheffield. Phone 26311 (ex 347). (C 670)

OWING to construction modification we have surplus to requirements, the following: ELECTRIC MOTORS, DISTRIBUTION BOARDS, PLUGS, FLUORESCENT FITTINGS, CABLE, CONDUIT and all types of FITTINGS. Suitable for contract work.—Apply, Box No. 2445, Electrical Times. (C 757)

SPECIAL clearance offer. Approx. 500 new and unused "Certostat" THERMOSTATS, 11½ in. long, complete with jackets. Type T/400, 1,100° to 190° Fahrenheit, a.c., 0/15 amp., 0/250 V. d.c. 0/1A-0/250 V. incorporating a Burgess micro-switch, all in original cartons. Price 12s. 6d. each ex works.—Uniproducts (Manchester) Ltd., 142 Bolton Road, Pendleton, Salford 6. Tel.: Pen. 2403. (C 703)

MISCELLANEOUS

FREE! Brochure giving details of courses in ELECTRICAL ENGINEERING and ELECTRONICS, covering A.M.Brit.I.R.E., City and Guilds, etc. Train with the Postal Training College operated by an Industrial Organisation. Moderate fees.—E.M.I. Institutes, Postal Division, Dept. ET.29, 43 Grove Park Road, London W.4. (Associate of H.M.V.) (C 240)

E.A.W. CERTIFICATE FOR ELECTRICAL SALES ASSISTANTS

THE NEXT EXAMINATION (Theoretical) for the E.A.W. Certificate for Electrical Sales Assistants will be held on Tuesday, May 19, 1953, from 2 p.m. to 5 p.m. at various centres in Great Britain.

Full particulars and entrance forms may be obtained from:—

Examinations Department,
The Electrical Association for Women,
35 Grosvenor Place,
London S.W.1.

Important.—The final date of entry for the Examination April 7, 1953. (C 751)

CITY AND GUILDS (Electrical, etc.) on "No Pass—No Fee" terms. Over 95 per cent. successes.—For full details of modern courses in all branches of Electrical Technology send for our 144-page handbook, FREE and post free.—B.I.E.T. (Dept. 39), 17 Stratford Place, London W.1. (C 239)

HOTEL SUITES. Large and small, available by the day, month, or year, including maid, butler, valeting, and full hotel service. Meals in fully licensed restaurant or suite.—St. James' Court, Buckingham Gate, S.W.1. Vic. 2360. (C 752)

FIRE!
WHICH COLOUR
NU-SWIFT?

Red, blue or black? Distinctive colours for different fire risks prevent costly errors. Are your extinguishers the right colours? Write, or phone Elland 2852, for free advice.

NU-SWIFT LTD. · ELLAND · YORKS

In Every Ship of the Royal Navy

GENRISTO *Boiling Plate*

LTD.
OSMASTON ST. NOTTINGHAM

850w—6" dia.
SOLID PLATE
EMBEDDED ELEMENT
Volts—200/10 and
230/50

cleaning up fuse-board design

The New 'SUPERFORM'

The new 'Superform' fuse-board possesses all the essential rigidity and is enclosed in a handsome, smooth shell of sheet steel which makes it dirt and dust-proof. The door is held tight by an automatic, push-button catch and, unless shut properly, swings wide open. It can never be left slightly ajar, allowing dirt to collect in the fuse-board. This greatly improved design includes an internal insulating barrier, easily removed for cabling. All 'Superform' fuse-boards are stove enamelled and with their unbroken contours are very easy to keep clean. They incorporate 'ENGLISH ELECTRIC' High Rupturing Capacity non-deteriorating cartridge fuse links complying with B.S.88 : 1947.
Prices and leaflet giving full details of range sent on request.

'ENGLISH ELECTRIC'
fusegear

THE ENGLISH ELECTRIC COMPANY LTD., QUEENS HOUSE, KINGSWAY, LONDON, W.C.2
Fusegear Works, East Lancashire Road, Liverpool, 10
WORKS: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL · ACCRINGTON
A.10

INDEX TO ADVERTISERS

Aberdare Electric Co., Ltd. ... 4
Aidas Electric, Ltd. 89
Arrow Electric Switches, Ltd. ... 98
Ash & Lacy, Ltd. 94
Astor, Boisselier & Lawrence, Ltd. 86
Automat Company, The ... 12
Automatic Light Controlling Co., Ltd. 96

Barbour, William, & Sons, Ltd. ... 12
Benjamin Electric Co., Ltd. ... 76
Berry's Electric, Ltd. 47
Best Products, Ltd. 90
Bray, Geo., & Co., Ltd. 44
Britannic Electric Cable & Construction Co., Ltd. 57
British Driver-Harris Co., Ltd. ... 44
British Electricity Authority ... 100
British Insulated Callender's Cables, Ltd. 9
British Iron & Steel Federation ... 31
British Physical Laboratories ... 96
British Thomson-Houston Co., Ltd. 39
B.V.C. Industrial Constructions, Ltd. 93
Brook Motors, Ltd. 24
Burco, Ltd. 59

Cable Makers' Association ... 55
Cayson Electrics, Ltd. 98
Channel Conduits, Ltd. 27
Clifford, Chas., & Son, Ltd. ... 86
Clyde Blowers, Ltd. 84
Cooper & Co. (Birmingham), Ltd. 2
Copper Development Association 22
Coughtrie, J. & G., Ltd. 75
Cressall Manufacturing Co., Ltd. 4
Critchley Bros., Ltd. 28
Crompton Parkinson, Ltd. ... 25

Dorman & Smith, Ltd. 92
D.S. Plugs, Ltd. 7

East London Mica Works ... 92
Edison Swan Electric Co., Ltd. ... 46
Eeto Insulations 90
Elkay Electrical Manufacturing Co., Ltd. 4
Enfield Cables, Ltd. 6
English Electric Co., Ltd. 16, 43, 73, 77
Enthoven Solders, Ltd. 14
Evershed & Vignoles, Ltd. ... 26

Ferranti, Ltd. 1
Fischer Bearings Co., Ltd. ... 36

General Cable Manufacturing Co., Ltd. 30
General Electric Co., Ltd. 45, 62
Genristo, Ltd. 72
Gent & Co., Ltd. 11
Gillott Electro Steam Cookers, Ltd. 8
Gledhill-Brook Time Recorders, Ltd. 90
Grelco, Ltd. 96
Grubb Engineering Co., Ltd. ... 13

Heayberd, F. C., & Co., Ltd. ... 82
Hedin, Ltd. 98
Henley's W.T. Telegraph Works Co., Ltd. 63, 82
Higgs Motors, Ltd. 10

Jackson Electric Stove Co., Ltd. 18, 19
Johnson & Phillips, Ltd. ... 32, 41

Kaye, E. & E., Ltd. 17
Kelly, John, & Son 34

Lancashire Dynamo Switchgear, Ltd. 38
Low Duncan, Ltd. 84
Lyons, Claude, Ltd. 37

Martindale Electric Co., Ltd. ... 20
Mather & Platt, Ltd. 80
McKechnie Bros., Ltd. 21
Metafiltration Co., Ltd. 78
Metropolitan Electric Cable and Construction Co., Ltd., The ... 53
Metropolitan-Vickers Electrical Co., Ltd. 15
Metway Electrical Industries, Ltd. 34

Nevelin Electric Co., Ltd. ... 87
Nife Batteries, Ltd. 3
Nu-Swift, Ltd. 72

Parmiter Hope & Sugden, Ltd. ... 101
Parsons, C. A., & Co., Ltd. ... 29
Philips Electrical, Ltd. 81
Pitman, Sir Isaac, & Sons, Ltd. ... 34
Premier Electric Heaters, Ltd. ... 79
Pultra, Ltd. 54
Pyrotenax, Ltd. 95

Radiovisor Parent, Ltd. 94
Rainsford & Lynes, Ltd. 28
Ranton & Co., Ltd. 83
Reyrolle, A., & Co., Ltd. ... 97
Rowlands Electrical Accessories, Ltd. 42

Sanders, William, & Co. (Wednesbury), Ltd. 40
Sangamo Weston, Ltd. 64
Sax, Julius, & Co., Ltd. 54
Scottish Cables, Ltd. 85
Seal-less Strapping, Ltd. 88
Serck Tubes, Ltd. 20
Siemens Electric Lamps & Supplies, Ltd. 60
Sifam Electrical Instrument, Co., Ltd. 54
Simplex Electric Co., Ltd. ... 23
Simon-Carves, Ltd. 33
Smart & Brown (Engineers), Ltd. 78
Smith, Frederick, & Co. 99
Smith Industrial Instruments Ltd. 40
Smith Meters, Ltd. 102
Standard Telephones & Cables, Ltd. 5
Sturdy Electric Co., Ltd. ... 94
Sutcliffe Speakman & Co., Ltd. ... 80
Synthetic Carbon & Engineering Co., Ltd. 98

Thew, Edward H., Ltd. 96
Thomas, Richard, & Baldwins, Ltd. 35
T.M.C.-Harwell (Sales), Ltd. ... 51
Tudor Accumulator Co., Ltd. ... 58
Turner Brothers Asbestos Co., Ltd. 48
Turnright Controls, Ltd. ... 74

Universal Boilers & Engineering Co., Ltd. 40

Venner, Ltd. 50
Volex Electrical Products, Ltd. ... 49

Westinghouse Brake & Signal Co., Ltd. 91
Whitecross Co., Ltd. 8
Wootton & Co., Ltd. 88

Yarrow & Co., Ltd. 52
Yorkshire Electric Transformer, Ltd. 56

Turnright *for* COOKER SWITCHES

TURNRIGHT CONTROLS LTD., West Hill, Hoddesdon, Hertfordshire

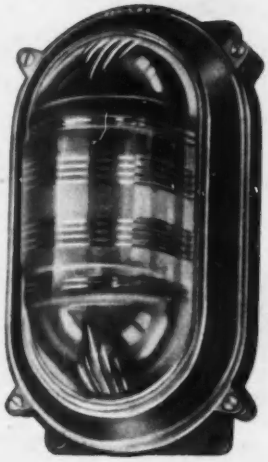
COUGHTRIE

PRISMATIC FITTINGS

IN ALUMINIUM ALLOY

100 WATT
LIST No. SP.10

60 WATT
LIST No. SP.6

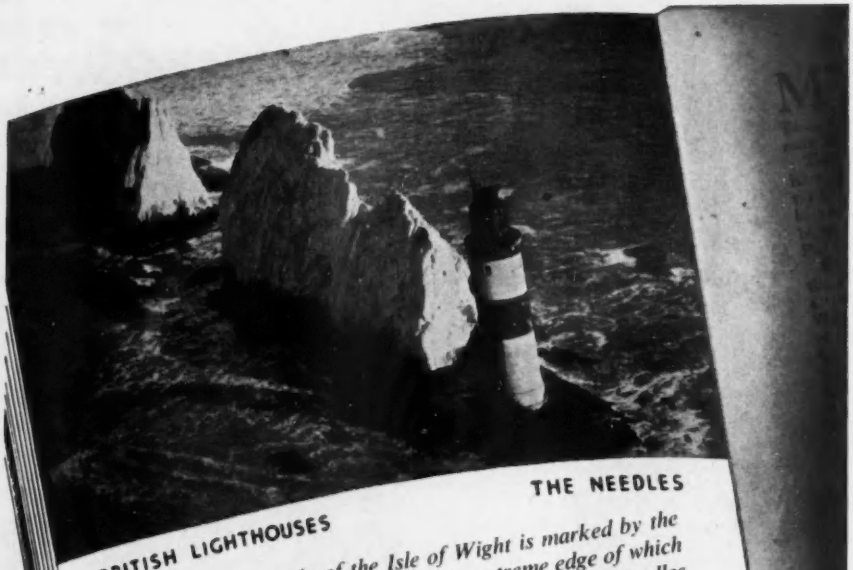


Always better than they have to be

CATALOGUE AVAILABLE ON REQUEST

MANUFACTURED AT **HILLINGTON, GLASGOW, S.W.2**

by **J. & G. COUGHTRIE LTD.**



BRITISH LIGHTHOUSES

THE NEEDLES

The westernmost tip of the Isle of Wight is marked by the Needles—a line of jagged rocks, the extreme edge of which is surmounted by an 80 ft. high Lighthouse. The Needles light, visible 14 miles away, is an eagerly-looked-for beacon —a signal of welcome to ships nearing home.

Safety is the watchword for good lighting; and in the new, additional Benjamin Research Laboratories, the safe, dependable lighting that enables Industry to work at the concert pitch of efficiency, is assured scientifically by the most advanced of technically correct methods. You make certain of the best lighting results when you specify Benjamin Equipment.

SEEING IS BELIEVING — IN SAFETY.

THE BENJAMIN ELECTRIC LTD

Established 1908

BRANTWOOD ROAD, TOTTENHAM

LONDON, N.17

Tel. Tottenham 5282 (5 lines)

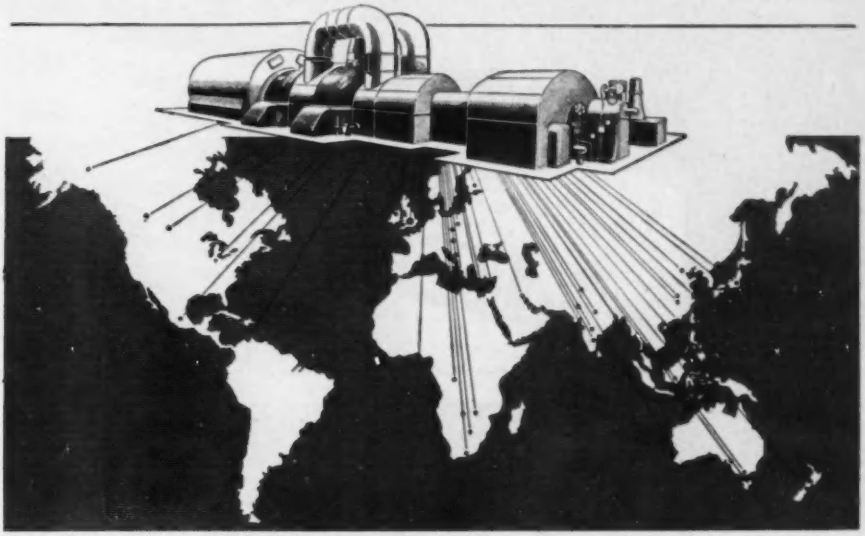
5, CORPORATION STREET, BIRMINGHAM Tel. Midland 5197

39, BASINGHALL STREET, LEEDS 1 Tel. Leeds 25379

BENJAMIN REGD.

'ENGLISH ELECTRIC'

steam turbo-alternator sets



POWER GENERATION

The ENGLISH ELECTRIC Company has been designing and manufacturing steam turbo-generating plant of all types for Central Power Stations and industry for many years. This includes a wide range of machines with capacities up to 100,000 kW, hydrogen cooled, running at 3,000 r.p.m. and operating with steam conditions up to 1,500 p.s.i.g. and 1050° F.

During 1951 The ENGLISH ELECTRIC Company supplied 35.7% of all the new turbo-alternator sets commissioned in B.E.A. Power Stations.

In almost every country throughout the world 'ENGLISH ELECTRIC' steam generating plant and its associated transmission and distribution equipment are providing electric power for industry and the home.

The ENGLISH ELECTRIC Company Limited

QUEENS HOUSE, KINGSWAY, LONDON, W.C.2

Steam Turbine Division, Rugby

Works: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL · ACCRINGTON

STTA.6

Something new

from this season's range!

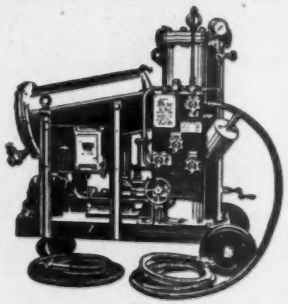
"MAXILITE" Cat. No. SF 15. 5ft. 80 watt
Price £4. 19. 6 (including control gear)
Please write to SMART & BROWN direct for leaflets
or obtain details from your normal wholesaler.

SB Hi-Craft

HEAD SALES OFFICE: SMART & BROWN (ENGINEERS) LIMITED
8 ROSE & CROWN YARD, KING STREET, ST. JAMES, LONDON, S.W.1
Tel: WHITEHALL 8267/8

Cold Filtration of Insulating Oils

The insulating value of used transformer and switch oils by one passage through the Metafilter is raised to a higher break-down voltage than the new oil.
The plant is purely mechanical and extremely simple in operation.



Capacities from 20 gallons to 1,000 gallons per hour.

METAFILTRATION

PHONE: HOUNSLOW 1121/2/3
GRAMS: METAFILTER, HOUNSLOW

THE METAFILTRATION COMPANY LIMITED, BELGRAVE ROAD, HOUNSLOW, MIDDLESEX

"..Yes Sir! this Iron has EVERYTHING.."

Only 3¼ lbs in weight—featherlight for the wife sir.

The accurate pre-set Thermostat guarantees 100% Heat Control.

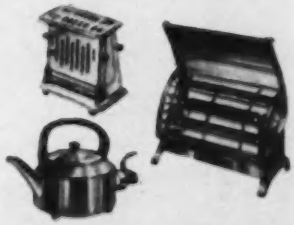
Just see how the illustration shows the Strength of the Perfectly cast special alloy, base—with new steel tube-encased 'Premicoil' Element Cast-in it—safe from atmosphere and damage. The only one with it in the Country Sir.

PREMIER don't just SAY it will last a lifetime—they PROVE it.

'Sylph' irons on continuous, gruelling test have now completed 15,500 hours without breakdown—That's a lot of ironing time.

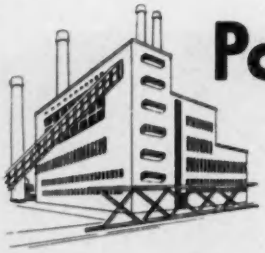
PREMIER
Fine-Quality APPLIANCES

"Sylph"
LIGHTWEIGHT IRON



"BE READY FOR THE RUSH"

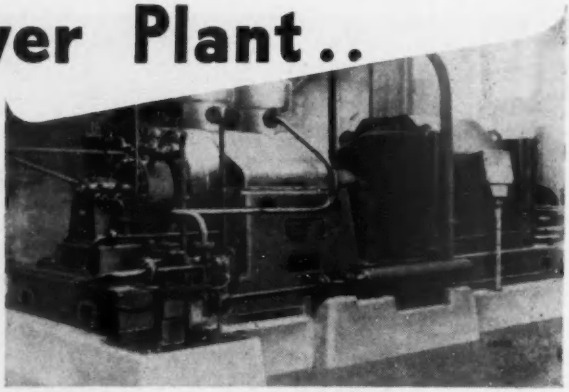
PREMIER ELECTRIC HEATERS LTD · BIRMINGHAM · 9
Member of A.E.I. Group of Companies



Power Plant..

by

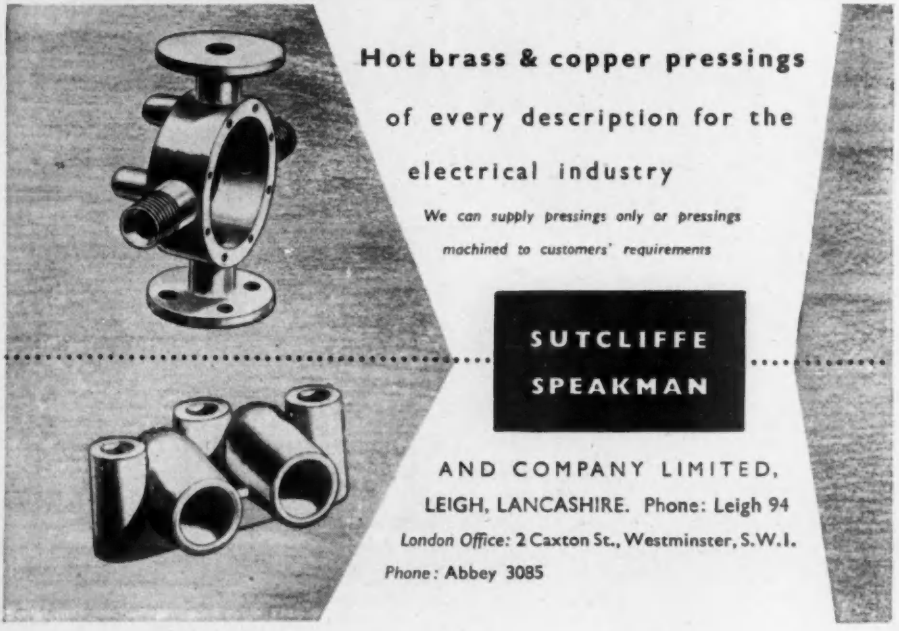
Mather & Platt Ltd.



One of nine motor-driven boiler feed pumps at Skelton Grange Power Station of the B.E.A., near Leeds. The pump delivers 720,000 lb. per hour at 217° F. and 1,360 lb. sq. in. The motor is a Mather & Platt direct on started squirrel cage machine taking a starting current four times full load. Rating: 1,850 b.h.p., 2,930 r.p.m., 3,000 v.

216

MATHER & PLATT LIMITED
PARK WORKS MANCHESTER 10



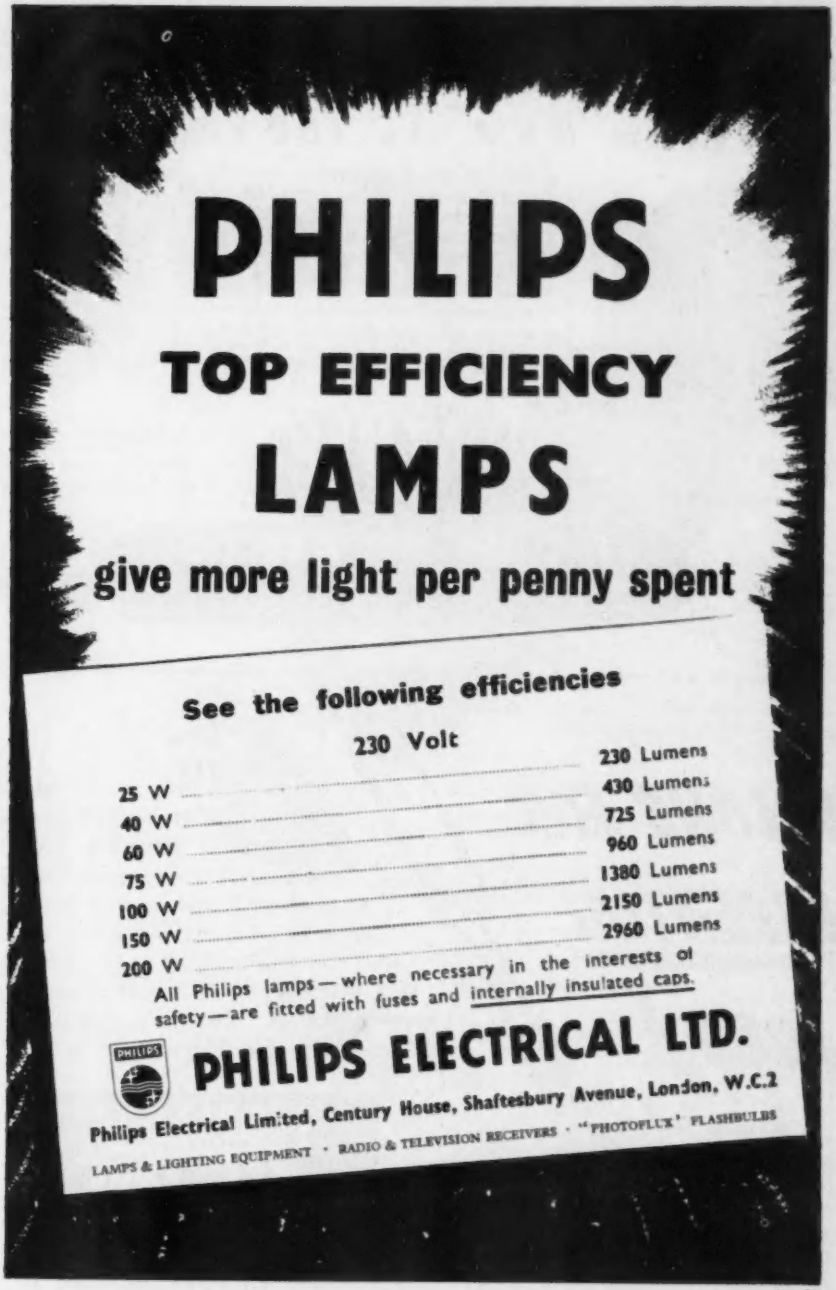
Hot brass & copper pressings

of every description for the electrical industry

We can supply pressings only or pressings machined to customers' requirements

SUTCLIFFE SPEAKMAN

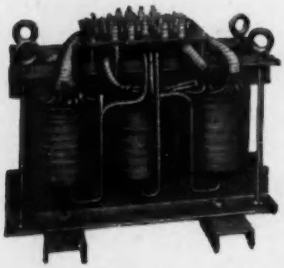
AND COMPANY LIMITED,
LEIGH, LANCASHIRE. Phone: Leigh 94
London Office: 2 Caxton St., Westminster, S.W.1.
Phone: Abbey 3085


PHILIPS
TOP EFFICIENCY
LAMPS
give more light per penny spent
See the following efficiencies
230 Volt
25 W 230 Lumens
40 W 430 Lumens
60 W 725 Lumens
75 W 960 Lumens
100 W 1380 Lumens
150 W 2150 Lumens
200 W 2960 Lumens
All Philips lamps — where necessary in the interests of safety — are fitted with fuses and internally insulated caps.
PHILIPS ELECTRICAL LTD.
Philips Electrical Limited, Century House, Shaftesbury Avenue, London, W.C.2
LAMPS & LIGHTING EQUIPMENT · RADIO & TELEVISION RECEIVERS · "PHOTOFLUX" FLASHBULBS

LD288

TRANSFORMERS

From 8 V.A. to 100 k.V.A.



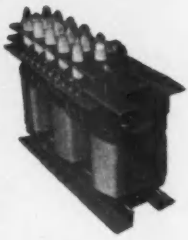
Primary : 400 V. 50 cycles, 3-phase. SECONDARY : 210/550 V. Star connected 50 k.V.A.

HEAYBERD Transformers are designed to give the utmost reliability and economy in operation, fully in accordance with the relevant British Standard Specifications.

We shall be pleased to quote for open, enclosed and oil-insulated transformers to suit your particular purpose.

Write for List 1044.

HEAYBERD

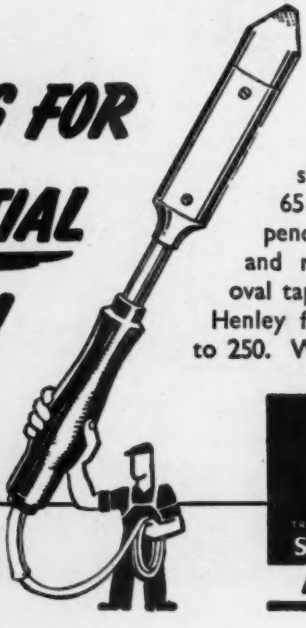


A high-voltage transformer. Primary, 400 V., 3-phase, 50 cycles. Secondary, 3,000 V. per phase.

F. C HEAYBERD & CO. LTD

Head Office: GREENWICH SOUTH STREET, S.E.10. Phone: TIDeway 4646 (3 lines)
Works: Greenwich. Cables & Telegrams: "Heayberd, Green, London"

SOLONS FOR ESSENTIAL JOBS!



Use SOLONS for the jobs that matter—this modern precision tool makes soldering speedier, simpler and more reliable. 5 models: 65 watt with oval tapered and round pencil bit; 125 watt with oval tapered and round pencil bit; 240 watt with oval tapered bit; each with 6 feet 3-core Henley flexible. Voltage ranges from 100 to 250. Write for folder Y.10.

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD., 51-53, Hatton Garden, London, E.C.1

HENLEY SOLON ELECTRIC TRADE MARK SOLDERING IRONS

FOR INDUSTRIAL USE

The New

Rock

Lampholder No. 104

Designed in accordance with British Standard Specification 52

See it and judge for yourself

Immediate Delivery from the Manufacturers

Strong
Easy to fit
Handsome
Serviceable

Ranton

AND CO. LTD.

Commerce Road, Brentford, Middx.
'Phone: EALING 5808 (3 lines)

250-12

Clyde SOOT BLOWERS
BOILER AVAILABILITY INCREASED

ELECTRO-MECHANICAL OPERATION with SEQUENCE CONTROL

Improvements Over Manual Operations

1. No physical exertion required.
2. Soot blowing carried out in a quarter of the time.
3. Shorter period of abnormal combustion conditions.
4. Cleaner heating surfaces with higher and sustained rate of evaporation.
5. Saving in fuel and labour costs.
6. Increased boiler availability.

London—
34 VICTORIA ST., S.W.1
Telephone: ABBEY 1847

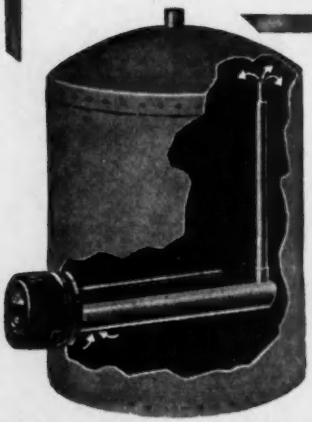
Manchester—
1 CHANCERY LANE, SPRING GARDENS
Telephone: DEAnsgate 4262

★

Clyde BLOWERS Ltd

LIVINGSTONE STREET, CLYDEBANK
'Phone: CLYDEBANK 1576/77 'Grams: 'MURWILS, GLASGOW'

Have you a water heating problem?



. . . solve it with "Dunlow" electric Immersion Heaters and Circulators

Side Entry—Top Entry and External Types can be supplied. Full information on request

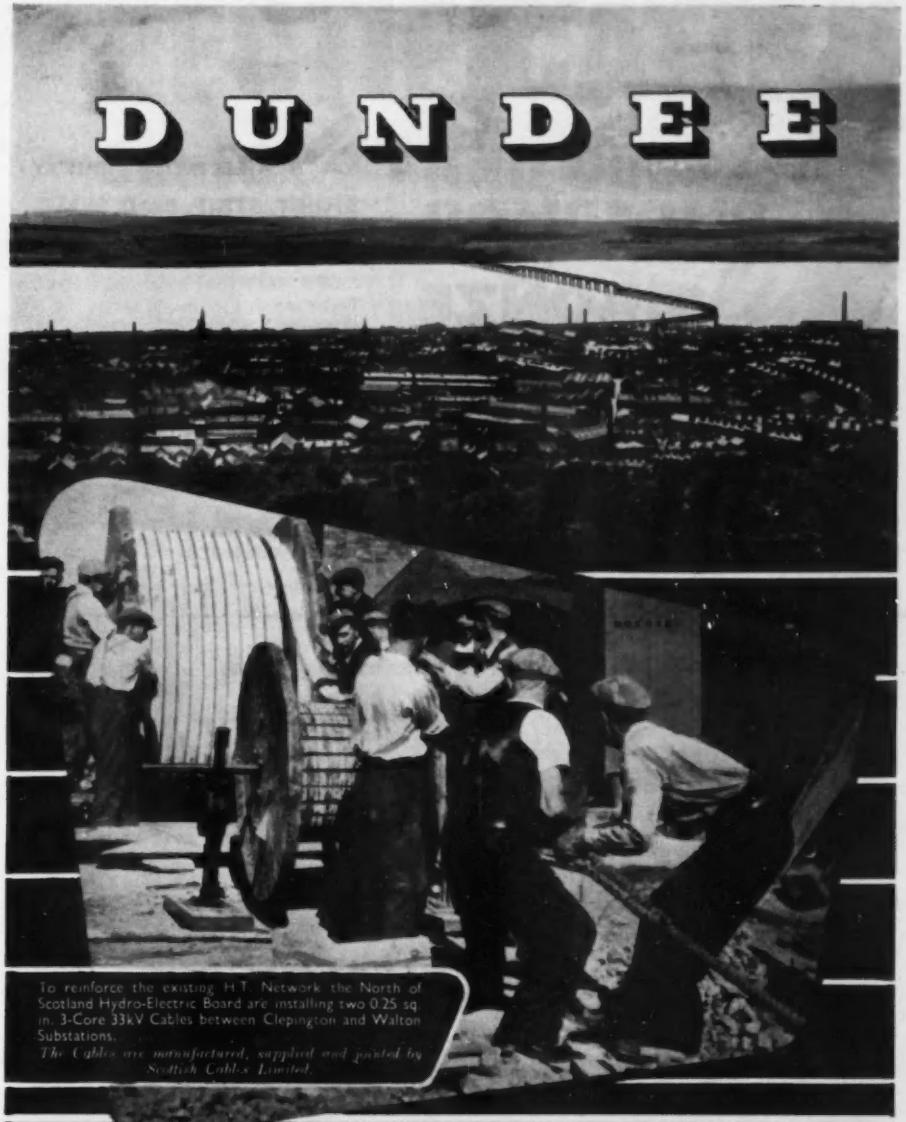
The easiest heater to fit
Side Fixing Type Circulator with mechanical flange 2, 3 and 4 *kw*

Phone: Bell 1961
Grams: "Immerser," Glasgow

DUNCAN LOW LIMITED
293 BELL STREET, GLASGOW, C4

Dunlow

DUNDEE



To reinforce the existing H.T. Network the North of Scotland Hydro-Electric Board are installing two 0.25 sq. in. 3-Core 33kV Cables between Clepington and Walton Substations.

The Cables are manufactured, supplied and jointed by Scottish Cables Limited.

SCOTTISH CABLES LIMITED

DEANSIDE • RENFREW • SCOTLAND

LONDON OFFICE • BUSH HOUSE • ALDWYCH, W.C.2

Associated Company: SCOTTISH CABLES (SOUTH AFRICA) LTD. PIETERMARITZBURG, NATAL

PHOSPHOR BRONZE

FOR THE ELECTRICAL INDUSTRY
SHEET, STRIP, ROD, WIRE,
TUBE, CHILL CAST BARS

. . . In a range of alloys containing 3% — 12% Tin for specific purposes; to private specifications and to British Standard Specifications.

Clifford

Chas. Clifford Brampton

ESTABLISHED 1767

CHARLES CLIFFORD & SON LTD., DOG POOL MILLS, BIRMINGHAM 30 and FAZELEY ST. MILLS, BIRMINGHAM 5
Offices: London, Glasgow, Manchester & Dublin

ss-w.88

---

with confidence, as only OKERIN Waxes are used.

Yours faithfully,
J. Power Factor

P.S.
Waxes are small in bulk but
bulk large in importance —
they must be just right for the
job and reliable Specify OKERIN.

PHONE: TEMPLE BAR 5927

Sales Department
ASTOR BOISSELIER & LAWRENCE LTD.
9 SAVOY STREET · STRAND · LONDON · W.C.2
Works and Laboratories · WEST DRAYTON · Middlesex

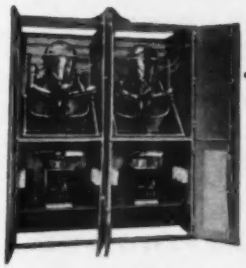
RECTIFICATION

COSTS *less* AND DOES *more*

WHEN YOU USE

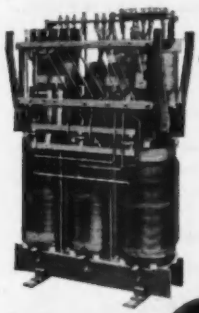
Nevelin

Technical Service



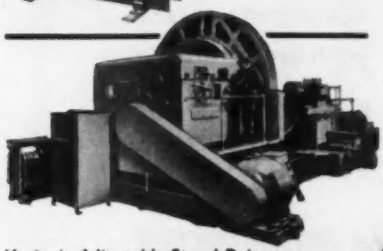
Mercury Arc Rectifiers

Grid Controlled Rectifiers



Rectifier Transformers

Adjustable Voltage Equipments



Varionic Adjustable Speed Drives

Those who buy electrical power conversion plant do so solely because it is necessary to their product or its manufacture. They prefer to bring their problems to an organisation which backs first quality equipment with a top-ranking technical service. The advantages are obvious, for they secure products of the most advanced design applied with an efficiency which ensures the highest productivity and the lowest installation, manufacturing and maintenance costs. If you have a problem in power rectification — it always pays to consult Nevelin — specialists in power rectification.

Nevelin Britain's Rectification Specialists

NEVELIN ELECTRIC CO. LTD · PURLEY WAY · CROYDON · SURREY

A 'LANCASHIRE DYNAMO' COMPANY *Telephone : CROydon 2268 Telegrams : Nevelin Croydon*

NR/1

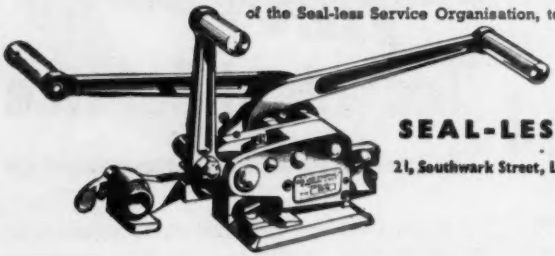
Handling Notes
No. 5

STRAPPING SERVICE

Representatives of Seal-less Strapping are available in all parts of the country to advise you without obligation of the many handling economies you can effect through Seal-less Strapping.

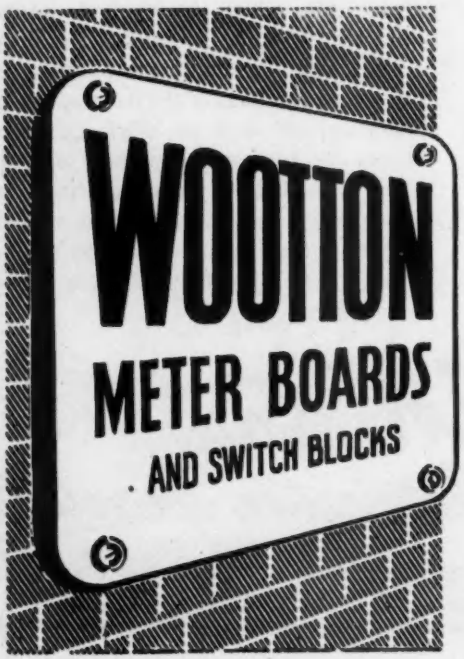
A phone call or postcard to Head Office will bring a representative qualified to give expert advice on your particular problems and to demonstrate the Seal-less Strapping System on your own packing floor.

All users of Seal-less Strapping are visited regularly by representatives of the Seal-less Service Organisation, to ensure that Seal-less equipment is maintained in perfect order.



SEAL-LESS STRAPPING LTD.

21, Southwark Street, London, S.E.1. (Telephone No. HOP 4224)



We have been making and supplying the Electrical Industry with METER BOARDS and Switch Blocks for over 27 years

- FIRST CLASS WORK
- QUICK DELIVERIES
- COMPETITIVE PRICES

We invite your enquiries

WOOTTON & CO., LTD.
ALMA WORKS, PONDERS END, MIDDX.
TELEPHONE: HOWARD 1858
L1048A

Sell **SADIA**

—sell satisfaction

Sadia 1½ gallon sink heater

FIRST in the field, and still the best, the Sadia has earned its reputation. Users recommend them to their friends, so that one sale leads to another.

The Sadia is built to last, smart and neat to look at, reliable and economical to run. When you sell your customer a Sadia, you are doing him a service.

SADIA
HOT WATER BY ELECTRICITY

For full details of latest models write to :
AIDAS ELECTRIC LIMITED
Sadia Works, Rowdell Road, Northolt, Middlesex.
Telephone : Waxlow 1607. *Telegrams : Aidaselect.*

Scottish Agents : W. Brown & Co. (Engineers) Limited, 89 Douglas Street, Glasgow, C.2. *Manufactured in South Africa by:* Sadia Water Heaters (Pty) Limited, 3-5 Newton Street, Village Main, Johannesburg.

THE NAME IS *Best* FOR QUALITY

This "BEST" COFFEE PERCOLATOR has a 2½-pint capacity, almost instant percolation, a special "keep hot" device and an automatic safety cut-out for the heater. Elegant in design and of superb craftsmanship in heavy gauge copper, it is finished in polished chrome. Loading 500 watts—A.C. only, 100/120, 200/220 and 230/250 volts.

"BEST" FANFARE KETTLE

Nominal capacity 4 pints. The "BEST" Fanfare Kettle has new Musical Alarm, and is fitted with connector-ejector safety device element. Chromium finish on hard copper. Loading 1500 watts, for 100/110, 200/220, 230/250 volts A.C./D.C.

"BEST" ELECTRIC JUGS

are useful alternatives to kettles for hot or boiling water supply. Their chromium plated repousse finish on solid copper graces any table, and special insulated feet protect even the most highly polished surfaces. Capacity: 2 pints (700 watts), or 4 pints (1250 watts); voltages as above.

SPARE "BEST" ELEMENTS

of Non-Automatic and Automatic Safety Connector-Ejector types are of thoroughly reliable construction. Two sizes: 700 watts for 2-pint kettles, and 1250 watts for 3½, 4, or 6-pint kettles. Automatic thermal switch (bimetal) elements are available, also higher loadings if required.

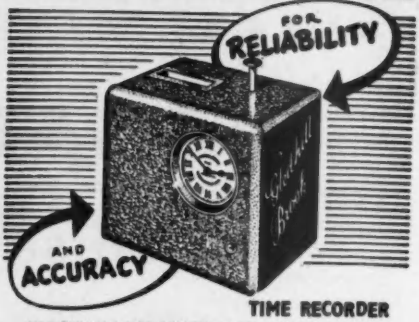
Best Products Ltd

FELIX WORKS, FELIXSTOWE, SUFFOLK

Phone: Felixstowe 554. Grams: Best, Felixstowe

B12

GLEDHILL-BROOK



TIME RECORDER

SPECIALLY DESIGNED FOR SMALL STAFFS

This useful GLEDHILL-BROOK Recorder is a handy portable size for small staffs. It records IN and OUT attendances as well as ON or OFF jobs. The clear and accurate time record is on the face of the card.

Available with an eight-day "G.B." mechanical clock movement with best quality lever escapement or the well-known "G.B." electric impulse movement. Soundly constructed in an all-steel case with cellulose finish.

Enquiries to:—

GLEDHILL-BROOK TIME RECORDERS LTD.

60, EMPIRE WORKS • HUDDERSFIELD

HEAT PRESERVATION BY EETO

CYLINDER JACKETS

The ORIGINAL sectional Cylinder and Tank jacket, as used and recommended by almost every Municipal Undertaking in the Kingdom. There is no substitute.

EETO SERVICE IS PROMPT & EFFICIENT

EETO INSULATIONS

RIVER ST., BOLTON, LANCS.

Tel.: Bolton 3764.

CW 1987/143a

THE PIONEERS

OF METAL RECTIFICATION

In 1720, Stephen Gray, a little known Englishman, experimented in exciting electricity by the friction of hair, wool, silk and paper. For his greatest experiment—a startling forerunner of the telegraph—he suspended a thread 826 feet long by loops of silk and succeeded in sending along it a current of electricity produced by rubbing glass. The present telecommunication systems are a combination of many such pioneering efforts, including the Westinghouse Copper Oxide Rectifier. Westinghouse Rectifiers are specified by the G.P.O. and leading equipment manufacturers for subscribers metering circuits, noise suppression in telephone earpieces and on switchboards and for relay slugging. Westinghouse will continue to pioneer Metal Rectifiers in various forms for greater development throughout the whole electrical industry.

WESTINGHOUSE

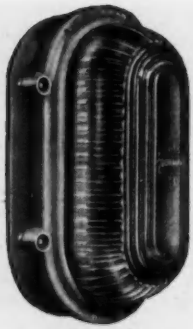
METAL RECTIFIERS

DEPT. E.T.5, WESTINGHOUSE BRAKE & SIGNAL CO. LTD.

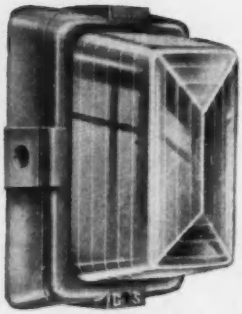
82 YORK WAY, KING'S CROSS, LONDON, N.1

DORMAN

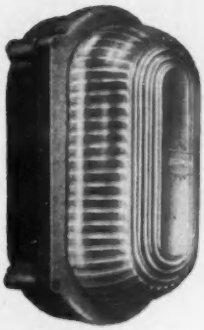
PRISMATIC LIGHTING FITTINGS



DIOLUX



DIOLUME



DIOPAL

ORDSAL

Write for list LFL352 to:-

DORMAN & SMITH (LIGHTING DIVISION) MANCHESTER 5

Electrical Insulation

MICA

Washers
Plates
Commutator Segments
Stampings
Stove Plates
Heater Strips,
etc.

MICANITE

Mouldings, Commutator Vee Rings, Tubes, Covered Bars, Commutator Segments, Heater Strips, Sheet Material in Moulding, Flexible, Heat Resisting and Commutator Qualities, etc.

BAKELITE

Tubes
Bushes
Bobbins
Washers
Stampings
Panels
Covered Bars,
etc.

Manufactured by

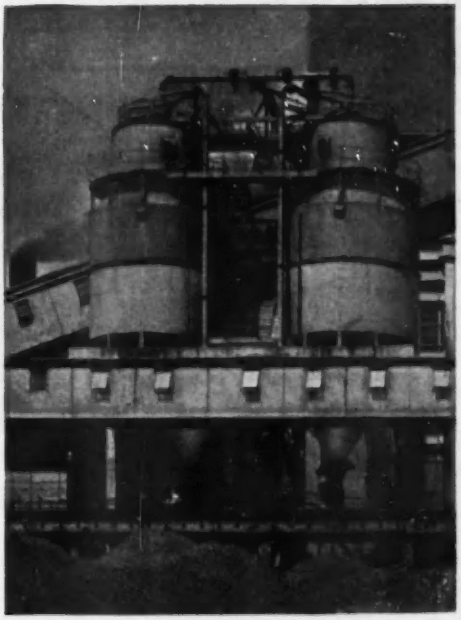
EAST LONDON MICA WORKS

RINGWOOD ROAD, WALTHAMSTOW, LONDON, E.17

'Phone: KEYstone 4254 *Telegrams: Elmicmer, Eastphone, London*

FLUE DUST AND RIDDLINGS

EXTRACTION PLANT



● The Nation's need demands that Coal shall convert every possible fraction of its energy into power for production. The vital contribution that efficient combustion makes to this end is immeasurably facilitated by B.V.C. Flue Dust Removal Plant. This is the recognised method of keeping steam boilers free from accumulations of flue dust, and ensuring that every ton of coal is used to the best possible advantage by removing and consuming the riddlings.

For Information and Consultation write to Dept. 14

B.V.C. INDUSTRIAL CONSTRUCTIONS LTD

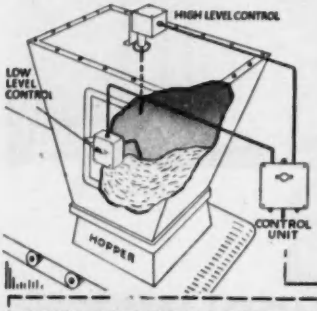
(Subsidiary of the British Vacuum Cleaner and Engineering Co. Ltd.)

Terminal House, 52 Grosvenor Gardens, London, S.W.1. Sloane 9975/8. Head Office: Leatherhead, Surrey

THE FIRST NAME IN PHOTO-ELECTRIC CONTROLS

RADIOVISOR

HOPPER AND BUNKER LEVEL CONTROL



Radiovisor Electronic Level Control Equipment relies for its operation on the material in the hopper making electrical contact with a fixed electrode, the tip of which is positioned at the desired material level.
The electrode is connected to a control unit containing a robust relay and a special feature of the design is the high input impedance which permits operation from materials behaving as insulators to low resistance detecting systems. For high and low level control two electrodes are positioned at different levels in the storage tank or hopper. As float gear and pressure switches are dispensed with and no moving parts employed, the equipment is not subject to wear.

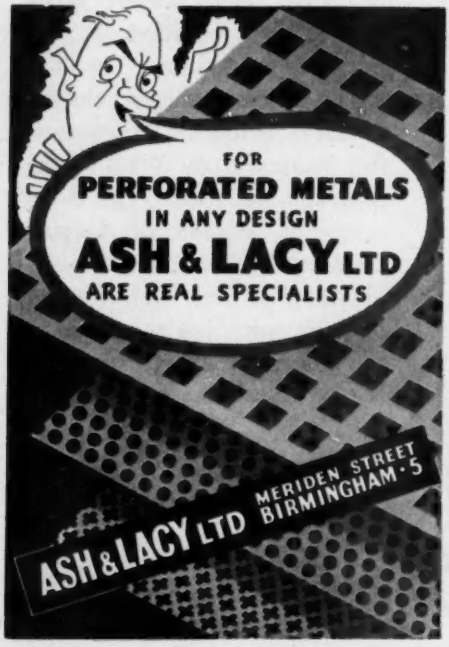
OTHER RADIOVISOR PHOTO-ELECTRIC & ELECTRONIC CONTROLS

FLAMESTAT FLAME FAILURE CONTROL
INDUSTRIAL SMOKE DENSITY INDICATOR
INVISIBLE RAY BURGLAR ALARM
SMOKE ALARM · PRINT REGISTRATION
COUNTING AND BATCHING UNIT
PROTECTIVE GUARD RAY
FACTORY LIGHTING CONTROL
AUTOMATIC RADIATION PYROSTAT

TO FILLING CONTROL OR ALARM

RADIOVISOR PARENT LTD · 1 STANHOPE STREET · N.W.1. *Telephone: EUSton 5905/6*

Makers of Electronic Controls for 25 years



STURDY TRANSFORMERS

live up to their name

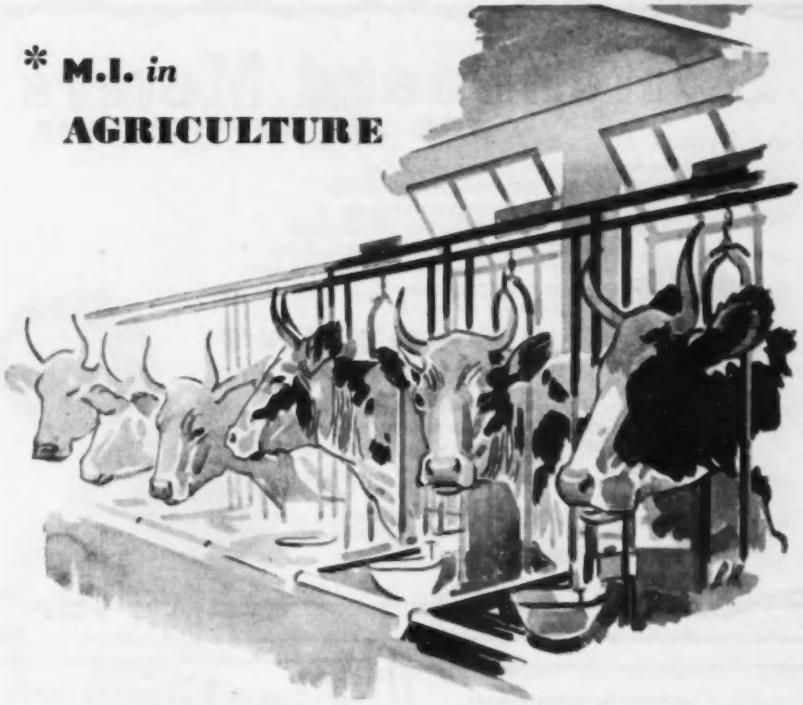
Sturdy Transformers are manufactured from 1kVA to 50kVA for all industrial applications and our technical service is always at your disposal.

Sturdy

ELECTRIC CO. LTD.

BURNOPFIELD (Telephone 237)
NEWCASTLE UPON TYNE

* M.I. *in* AGRICULTURE



Look in at his milking sheds and you will realise to what extent the modern farmer is dependent upon electricity. Pyrotenax M.I. electric cable is ideal for his purposes. For Pyrotenax is the safest cable, fire-resistant, tough, vermin-proof and easily installed. Most efficiently bonded of all cables and therefore safe against *shock* (very important where there are horses and cattle). It never deteriorates and therefore needs no maintenance or renewal. No conduit is required, indoors or out. A really sound investment.

* *Mineral Insulated Cables for Distribution and Control*

PYROTENAX IS AN EXCLUSIVE TRADE MARK NAME AND MUST ONLY BE USED TO DESIGNATE CABLES AND OTHER PRODUCTS MANUFACTURED BY THIS COMPANY AND ITS ASSOCIATES

Pyrotenax CABLES

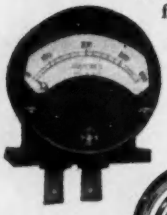
PYROTENAX LIMITED **HEBBURN-ON-TYNE**
PHONE : HEBBURN 32244/7

LONDON : *Phone.* ABBEY 1654/5 • **BIRMINGHAM** : *Phone.* MIDLAND 1265
GLASGOW : *Phone.* CENTRAL 2238 • **MANCHESTER** : *Phone.* BLACKFRIARS 6946

(GD61)

Switchboard Meters
FOR ALL APPLICATIONS

Precision craftsmanship guarantees accuracy and reliability under the most arduous conditions in our comprehensive range of Moving Iron and Moving Coil Switchboard Meters for A.C. or D.C., with Current Transformers, Shunts and Tachometers to meet your every requirement. Full details are available on request.



QUADRANT METER COMPANY LTD

Distributed by:
BRITISH PHYSICAL LABORATORIES
RADLETT · HERTS

Telephone:
Radlett 5674/5/6

dm BP 2

USE "GUNFIRE"
TRADE MARK
Time Switches
AND
Process Timers
FOR SATISFACTION
AUTOMATIC LIGHT CONTROLLING CO. LTD., BOURNEMOUTH
Established over 50 years

Grelco TERMINAL BLOCKS
LIMITED
2, 3, 4, 5, 6, 8, 10 and 12 ways in five types
Apply for folder to:—

GRELCO WORKS, MINEHEAD, SOMERSET
Telephone and Telegrams: MINEHEAD 740

ENGRAVED PLATES
OF ALL TYPES & IN ALL LANGUAGES
ENAMELLED - ENGRAVED - PLASTICS
CAST - DIECAST - BRONZE
EDWARD H. THEW LTD.

3, First Avenue, Team Valley, Gateshead on Tyne, 11
TELEphone: Low Fell 75667
TELEgrams: "Engraving, Gateshead-on-Tyne"

NOT ALL OF OUR 7,000 PEOPLE are switchgear specialists in the exact sense of the term. But a great many are specialists in some branch of switchgear manufacture, and though they may not fully appreciate all the intricacies of the entire switchgear complex, they know their own part of it backwards. And it is not merely a question of knowing; in all departments there is constant searching for new and better techniques. An illustration of this may be found in the departments concerned with the wiring of control panels. Recently they set to work to devise a new process which has led to a saving of time and material. The wiring and side frames for the control panels are pre-assembled and all connections are cut to length. The complete sub-assembly is then transferred to the shop floor for finishing with detailed components before despatch.

Our primary concern is designing and producing switchgear, so if you have any transmission or control problems, why not talk to us.

If you want to talk switchgear
. . . talk to Reyrolle

A. REYROLLE & COMPANY LTD. · HEBBURN · CO. DURHAM
CRC 208

TRANSFORMERS

MAINS CONVERSION AND
LOW VOLTAGE LIGHTING.
RECTIFIERS AND CHARGERS.
FLUORESCENT CONTROL GEAR

EXTENSIVE STANDARD RANGE
TWO YEARS GUARANTEE
MADE AND TESTED TO
B.S.S. 171 & 794
THOUSANDS IN DAILY USE
ALL OVER THE WORLD

HEAD OFFICE
QUEENS ROAD WATFORD
TEL: 7156 & 7177

CAYSON

LONDON OFFICE
ANGEL HOUSE
PENTONVILLE ROAD
THE ANGEL, LONDON N.1.
TEL: TERminus 0566

CAYSON ELECTRICS LTD., WATFORD HERTS.

HEDIN

INDUSTRIAL HEATING
APPLIANCES AND
RESISTANCE UNITS

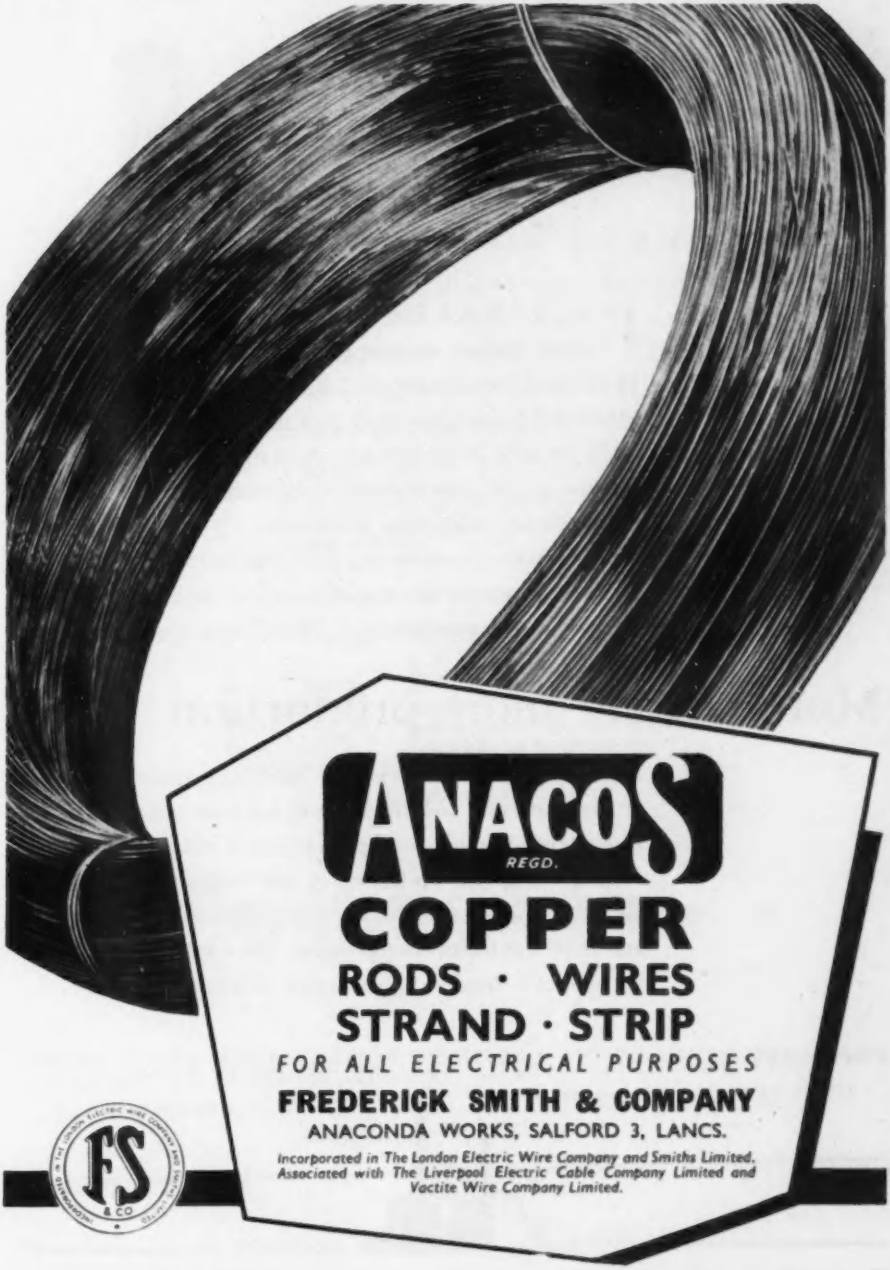
HEDIN, LTD.
COMMERCE ESTATE, SOUTH WOODFORD,
LONDON, E.18
Tel.: Buc. 6601/2.

ARROW
MOTOR CONTROL
GEAR
The *design* you'll choose

SWITCH AND CONTROL GEAR SPARES
CONTACTOR
FINGERS

FOR
ELECTRIC VEHICLES
TROLLEYBUSES
TRAMS, ETC.

SYNTHETIC CARBON & ENG. CO. LTD.
"Dept. T," Cumberland Road, Stanmore, Middx.
Telephone: WORDSWORTH 1240-4200


ANACOS
REGD.
COPPER
RODS · WIRES
STRAND · STRIP
FOR ALL ELECTRICAL PURPOSES
FREDERICK SMITH & COMPANY
ANACONDA WORKS, SALFORD 3, LANCS.
Incorporated in The London Electric Wire Company and Smiths Limited.
Associated with The Liverpool Electric Cable Company Limited and
Vactite Wire Company Limited.
FS
& CO

MORE

Electricity

PER TON OF COAL

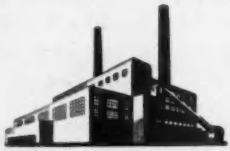
IN 1952 the British Electricity Authority again installed a record amount of new generating plant—more than 1½ million kilowatts, or over 2,000,000 horse power. Modern generating plant operates at high thermal efficiencies — up to 30 per cent in some cases. As a direct result, large and increasing savings of coal are being made every year through more efficient electricity generation.

On present consumption, every one per cent increase in the average annual thermal efficiency of the nation's power stations saves approximately 1,500,000 tons of coal each year.

More power: more production

The more power progressively becoming available makes vitally important contributions to the national well-being. It is essential to increased production in industry and agriculture; it speeds up transport and commercial services; and it adds to the amenities of living through labour-saving and other appliances in the home. Electricity for whatever purpose it is used is too valuable to waste.

FOR MORE PRODUCTION, USE MORE POWER, MORE EFFICIENTLY



BRITISH ELECTRICITY

Printed in England for the Proprietors, THE ELECTRICAL TIMES, LTD., by SUN PRINTERS, LTD., London and Watford, Herts, and published at Sardinia House, Sardinia Street, London W.C.2. February 26, 1953

STANDARD AND INTERCHANGEABLE

60 amp. size with 45, 30 & 15 amp. underwirings

With dimensions according with BS.1361, breaking capacity according with BS.88 category 440 AC4, fusing factor to Class P, complete freedom from ageing and the retention of all Aeroflex established characteristics.

Rewireable too!

Aeroflex Ceram Fuse Links are interchangeable with other leading makes and can be rewired instead of discarded.

Aeroflex CERAM TYPE CSK

HOPE'S PATENTS

CARTRIDGE FUSE LINKS

PARMITER HOPE & SUGDEN LTD., MANCHESTER, 12

London: 34 VICTORIA ST., S.W.1 *Glasgow:* 162 BUCHANAN ST., C.1

Birmingham: 39/42 CARRS LANE, 4

dm PH 65

ELECTRICAL TIMES 26 FEBRUARY 1953

NEW SMITH METER

TYPE A M SINGLE PHASE—SOME TECHNICAL DATA

★ **Maximum Current Ratings**
10, 40 and 80 amperes.

★ **Torque at max. load**
12.5 gr. cms.

★ **Losses in Shunt Coils**
1.2 watts—4.3 VA.

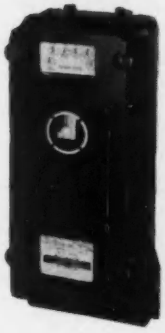
★ **Losses in Series Coils**
2.8 watts—3 VA.

★ **Rotor speed at max. load**
48 r.p.m.

★ **Temperature Coeff. Unity and Power Factor Load**
0.02% deg. C.

SMITH spells accuracy in meters

TYPE P. Polyphase Meter is continued unchanged as the best meter in its class, having a perfect curve under all conditions.



SMITH METERS

SMITH METERS LTD · ROWAN ROAD · STREATHAM VALE · SW16
Scottish Works: Kinbuck Works, Dunblane. Telephone Dunblane 2313. Also in Leeds